(19) JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: **07220025 A**

(43) Date of publication of application: **18. 08 . 95**

(51) Int. Cl **G06K 9/22**
G06T 1/00
G06K 9/20
H04N 1/387

(21) Application number: **06009806**

(22) Date of filing: **31 . 01 . 94**

(71) Applicant: **CANON INC**

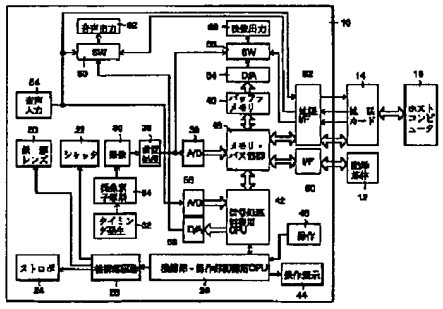
(72) Inventor: **HORI MASASHI**

(54) **PICTURE PROCESSOR**

(57) Abstract:

PURPOSE: To easily recognize characters from an input picture from a camera.

CONSTITUTION: An object document is photographed divisionally in plural areas. An extended card 14 is provided with picture synthesizing function software for synthesis of divided pictures and character recognizing function software which converts character pictures to character codes. A memory bus control circuit 48 is provided with the inter-picture movement detecting function. Plural divisionally photographed pictures are synthesrzed, and characters are otherwise recognized. Otherwise they are subjected to character recognition and inter- picture movement is referred to synthesize the character recognition results of different pictures into a sentence.



(19)日本国特許庁（ＪＰ）　(12) 公開特許公報（A）　(11)特許出願公開番号

特開平7－220025

(43)公開日　平成７年(1995)８月18日

(51)Int.Cl.[6]		識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｇ０６Ｋ	9/22				
Ｇ０６Ｔ	1/00				
Ｇ０６Ｋ	9/20	３２０　Ｊ			
Ｈ０４Ｎ	1/387				
				Ｇ０６Ｆ　15/ 66　４７０　Ｊ	

審査請求　未請求　請求項の数19　ＯＬ　（全 12 頁）

(21)出願番号　特願平6－9806

(22)出願日　平成６年(1994)１月31日

(71)出願人　000001007
キヤノン株式会社
東京都大田区下丸子３丁目30番２号

(72)発明者　堀　正志
東京都大田区下丸子３丁目30番２号キヤノン株式会社内

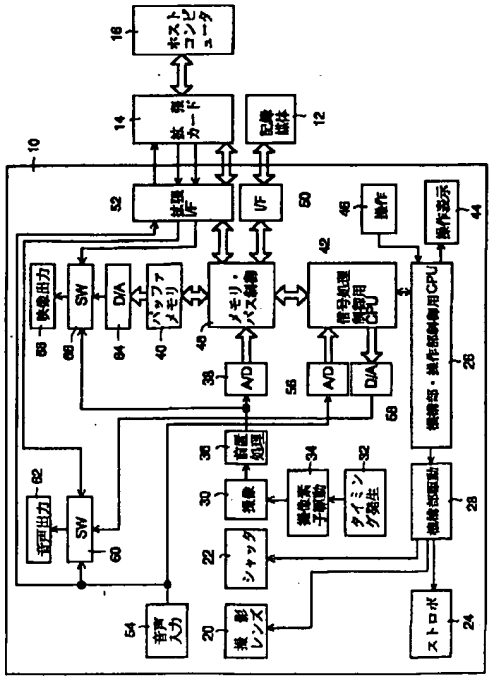
(74)代理人　弁理士　田中　常雄

(54)【発明の名称】　画像処理装置

(57)【要約】

【目的】　カメラによる入力画像からの文字認識を容易にする。

【構成】　被写体原稿を複数の領域で分割撮影する。拡張カード１４には、分割画像を合成する画像合成機能ソフトウエアと、文字画像を文字コードに変換する文字認識機能ソフトウエアを持たせてある。メモリ・バス制御回路４８は画像間の動きを検出機能を具備する。分割撮影した複数の画像を画像合成し、文字認識する。又は、分割撮影した画像を文字認識し、画像間の動きを参照して、異なる画像の文字認識結果を文章合成する。



1

【特許請求の範囲】

【請求項１】　被写体像を連続的に電気信号に変換する変換手段と、当該変換手段の変換面における画像の動きを検出する動き検出手段と、当該動き検出手段により検出された動きに従い、当該変換手段による複数の画像を合成する合成手段と、当該合成手段により合成された合成画像中の文字画像を文字コードに変換する文字認識手段とを有することを特徴とする画像処理装置。

【請求項２】　更に、上記動き検出手段の検出結果に従い上記撮像手段による複数の撮影画像間の重複部分を検出する重複検出手段と、重複部分とそれ以外の部分とを識別できるように撮影画像を表示する表示手段とを設けた請求項１に記載の画像処理装置。

【請求項３】　更に、上記動き検出手段の検出結果を所定値を比較する比較手段を有し、上記画像合成手段が、当該所定値以上の動きのある撮影画像を画像合成の対象とする請求項１に記載の画像処理装置。

【請求項４】　更に、新たな撮影画像から重複量を算出する重複量算出手段を具備し、上記画像合成手段が、当該重複量が所定値以上のとき、当該新たな撮影画像を画像合成する請求項１に記載の画像処理装置。

【請求項５】　更に、撮影画像から文字間隔を検出する文字間隔検出手段を有し、上記重複検出手段は、合成すべき画像の重複量を文字単位で検出する請求項２に記載の画像処理装置。

【請求項６】　上記動き検出手段が、動き検出の基準点と撮影画角との位置関係に従って、撮影画像間の基準点の移動量及び移動方向から複数の画角の位置関係を求め、上記画像合成手段が、画角間の位置関係から複数画像の重複部分を検出し、重複部分を除去して画像合成する請求項１に記載の画像処理装置。

【請求項７】　被写体像を連続的に電気信号に変換する変換手段と、当該変換手段の変換面における画像の動きを検出する動き検出手段と、当該変換手段により変換された各画像に含まれる文字画像を文字情報に変換する文字情報変換手段と、当該動き検出手段により検出された動きに従い、当該文字情報変換手段により認識された文字を合成する文字データ合成手段とを有することを特徴とする画像処理装置。

【請求項８】　更に、上記動き検出手段の検出結果に従い上記撮像手段による複数の撮影画像間の重複部分を検出する重複検出手段と、重複部分とそれ以外の部分とを識別できるように撮影画像を表示する表示手段とを設けた請求項７に記載の画像処理装置。

【請求項９】　上記文字データ合成手段が、上記文字認識手段による複数の撮影画像の文字コード・データから同一文字認識部分を検出する共通部検出手段を有し、当該共通部検出手段の検出結果を基に複数の撮影画像の文字コード・データを文章合成する請求項７に記載の画像処理装置。

2

【請求項１０】　更に、上記動き検出手段の検出結果を所定値を比較する比較手段を有し、上記文字データ合成手段が、当該所定値以上の動きのある撮影画像の文字認識結果を合成対象とする請求項７に記載の画像処理装置。

【請求項１１】　更に、撮影画像から文字間隔を検出する文字間隔検出手段を有し、上記重複検出手段は、合成すべき画像の重複量を文字単位で検出する請求項８に記載の画像処理装置。

【請求項１２】　上記動き検出手段が、動き検出の基準点と撮影画角との位置関係に従って、撮影画像間の基準点の移動量及び移動方向から複数の画角の位置関係を求め、上記文字データ合成手段が、画角間の位置関係から複数画像の認識結果の重複部分を検出し、重複部分を除去して文字コードを文章合成する請求項８に記載の画像処理装置。

【請求項１３】　変倍機能を持ち、光学像を連続的に電気信号に変換する変換手段と、当該光学像内の文字領域を検出する文字領域検出手段と、当該文字領域検出手段の検出結果を基に当該変倍機能を動作させる制御手段とを有することを特徴とする画像処理装置。

【請求項１４】　更に、撮影画像上の文字の大きさを検出する文字サイズ検出手段と、文字の大きさから文字認識が可能か否かを判別する判別手段とを有し、文字認識が不可能な文字の大きさのとき、認識可能な大きさに上記変倍機能を制御する請求項１３に記載の画像処理装置。

【請求項１５】　最大限に拡大してなお文字認識不可のとき所定の警告を出力する請求項１４に記載の画像処理装置。

【請求項１６】　更に、撮影画像上の文字の大きさを検出する文字サイズ検出手段と、文字の大きさから文字認識が可能か否かを判別する判別手段と、文字認識が可能な文字サイズとなる拡大率を算出する拡大率算出手段とを有する請求項１３に記載の画像処理装置。

【請求項１７】　更に、撮影画像上の文字の大きさを検出する文字サイズ検出手段と、文字の大きさから文字認識が可能か否かを判別する判別手段と、文字認識が可能な文字サイズとなる拡大率を算出する拡大率算出手段とを有し、撮影画像に対する拡大時の撮影画角を１以上の撮影画像とともに表示する請求項１３に記載の画像処理装置。

【請求項１８】　更に、撮影画像上の文字の大きさを検出する文字サイズ検出手段と、文字の大きさから文字認識が可能か否かを判別する判別手段と、文字認識が可能な文字サイズとなる拡大率を算出する拡大率算出手段とを有し、拡大撮影時の撮影画角による分割撮影領域を撮影画像とともに表示する請求項１３に記載の画像処理装置。

【請求項１９】　更に、撮影画像から文字間隔を検出す

る文字間隔検出手段と、文字間隔から被写体原稿の縦書き横書きを判別する縦横判別手段とを有し、文字の行方向により垂直及び水平の何れか一方に沿った基準線を撮影画像とともに表示する請求項１３に記載の画像処理装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、画像処理装置に関する。

【０００２】

【従来の技術】文字認識では、従来、イメージ・スキャナなどの画像入力手段により印刷文字を先ず、画像データ化し、その後、コンピュータ上の文字認識ソフトウエアにより文字画像を文字コードに変換する。画像入力手段としては、イメージ・スキャナの他に、ディジタル電子カメラがある。ディジタル電子カメラは、印刷面が平面的でない場合や、イメージ・スキャナで読み取れないような大きなものを画像入力する場合に適している。

【０００３】

【発明が解決しようとする課題】文字認識のための画像入力手段としてディジタル電子カメラを使用する場合、当然のことながら、撮影画像における文字の大きさが文字認識可能な程度に大きくなければならない。文字認識可能な大きさに文字を撮影するために被写体原稿を複数回に分けて撮影する場合、複数の画像を取り込んだ後に各画像を文字認識した後、各文字認識結果をワードプロセッサにより本来の順序に文章編集することになり、煩雑な操作と多大な時間がかかるという欠点がある。

【０００４】本発明は、このような不都合を解消する画像処理装置を提示することを目的とする。

【０００５】本発明は又、操作性を向上させた画像処理装置を提供することを目的とする。

【０００６】本発明は更に、文字認識の精度を向上させた画像処理装置を提供することを目的とする。

【０００７】

【課題を解決するための手段】第１の発明に係る画像処理装置は、被写体像を連続的に電気信号に変換する変換手段と、当該変換手段の変換面における画像の動きを検出する動き検出手段と、当該動き検出手段により検出された動きに従い、当該変換手段による複数の画像を合成する合成手段と、当該合成手段により合成された合成画像中の文字画像を文字コードに変換する文字認識手段とを有することを特徴とする。

【０００８】第２の発明に係る画像処理装置は、被写体像を連続的に電気信号に変換する変換手段と、当該変換手段の変換面における画像の動きを検出する動き検出手段と、当該変換手段により変換された各画像に含まれる文字画像を文字情報に変換する文字情報変換手段と、当該動き検出手段により検出された動きに従い、当該文字情報変換手段により認識された文字を合成する文字データ合成手段とを有することを特徴とする。

【０００９】第３の発明に係る画像処理装置は、変倍機能を持ち、光学像を連続的に電気信号に変換する変換手段と、当該光学像内の文字領域を検出する文字領域検出手段と、当該文字領域検出手段の検出結果を基に当該変倍機能を動作させる制御手段とを有することを特徴とする。

【００１０】

【作用】撮像装置に文字認識機能を付加することにより、任意の大きさの原稿への対応が可能になる。また、撮影時に被写体原稿の文字の大きさを検出し、文字認識が可能か否かを判別して、適宜に、認識可能な大きさに拡大撮影するので、認識率を高めることができる。更に、撮影画像の動きにともなう複数画像間の位置関係を随時検出し、検出結果をもとに複数画像又はその認識結果を画像合成又は文章合成するので、煩雑な操作をしなくて済む。

【００１１】

【実施例】以下、図面を参照して、本発明の実施例を詳細に説明する。

【００１２】図１は、本発明の一実施例の概略構成ブロック図を示す。図１において、１０はディジタル電子カメラの本体、１２はその記録媒体（ＰＣＭＣＩＡ規格のメモリ・カード又はハードディスク装置など）、１４は文字認識機能を具備する拡張カードである。拡張カード１４はホストコンピュータ１６とも接続又は通信できる。

【００１３】カメラ本体１０において、２０は撮影レンズ、２２は絞り機能とシャッター機能を兼ねる絞り兼用シャッタ、２４はストロボ、２６は機構部及び操作部を制御するＣＰＵ、２８は機構部を駆動する駆動回路である。３０は撮影レンズ２０による被写体の光学像を電気信号に変換する撮像素子、３２は撮像素子３０を動作させるために必要なタイミング信号を発生するタイミング信号発生回路、３４はタイミング信号発生回路３２からのタイミング信号に従い撮像素子３０を駆動する撮像素子駆動回路、３６は撮像素子３０の出力からノイズを除去するＣＤＳ回路及びＡ／Ｄ変換前に非線形増幅する非線形増幅回路を備える前置処理回路、３８は前置処理回路３６のアナログ出力をディジタル信号に変換するＡ／Ｄ変換器である。４０はバッファ・メモリ、４２は各信号処理部を制御する信号処理系制御用ＣＰＵ、４４は操作補助のための情報やカメラの状態を表示する操作表示装置、４６はカメラ本体１０を外部から制御するための操作装置である。４８はバッファ・メモリ４０の書き込み及び読み出しを制御すると共に、画像データ及び音声データの転送を制御するメモリ・バス制御回路であり、本実施例では、連続撮影時に、動きベクトルも検出する機能を具備する。

【００１４】５０は本体１０に記録媒体１２を接続する

5

インターフェース、５２は拡張カード１４を接続する拡張インターフェースである。

【００１５】５４はマイク等の音声入力回路、５６は音声入力回路５４のアナログ出力をディジタル化して信号処理制御用ＣＰＵ４２に印加するＡ／Ｄ変換器、５８は信号処理制御用ＣＰＵ４２からのディジタル音声信号をアナログ化するＤ／Ａ変換器、６０は、音声入力回路５４の出力、Ｄ／Ａ変換器５８の出力又は拡張インターフェース５２からの音声信号を選択して、音声出力装置６２に印加するスイッチである。音声出力装置６２は一般的にはスピーカであるが、音声出力端子であってもよい。６４はバッファ・メモリ３８に記憶される画像データをアナログ映像信号に変換するＤ／Ａ変換器、６６は、前置処理回路３６の映像信号出力、Ｄ／Ａ変換器６４の映像信号出力又は拡張カード５２からの映像信号を選択して、映像出力装置６８に印加するスイッチである。映像出力装置６８は一般的には映像表示装置であるが、映像出力端子であってもよい。

【００１６】図２は、拡張カード１４の内部の概略構成ブロック図を示す。７０は拡張バス・インターフェース（Ｉ／Ｆ）、７２は撮像信号処理回路、７４は間引き処理回路、７６はバッファ・メモリ、７８はバス・コントローラ、８０は外部Ｉ／Ｆコントローラである。８２は動画圧縮伸長回路、８４はビデオ・エンコーダ、８６はバッファ・メモリ７６からの画像データをアナログ信号に変換するＤ／Ａ変換器、８８はカメラ本体１０からのアナログ音声信号をディジタル化するＡ／Ｄ変換器、９０はカメラ本体１０に出力すべき音声データをアナログ信号に変換するＤ／Ａ変換器である。９２は高速演算が可能なＲＩＳＣ型ＣＰＵ、９４はＲＩＳＣ型ＣＰＵ９２の動作プログラムを記憶するプログラムＲＡＭ、９６はＲＩＳＣ型ＣＰＵ９２のＢＩＯＳを記憶するフラッシュＲＯＭである。

【００１７】先ず、ディジタル電子カメラとしての本来の動作を簡単に説明する。撮影者が操作装置４６で所定の操作をすることにより撮影可能状態になり、機構部・操作部制御用ＣＰＵ２６が駆動回路２８を介してレンズ系を撮影者の意図に応じた状態に制御する。この際、撮影条件などが操作表示装置４４に表示され、撮影者にカメラの状況を伝える。不図示の測光回路が被写体の明るさを測定し、この測定値に従い絞り兼用シャッタ２２の絞り値及びシヤッタ速度を機構部・操作部制御用ＣＰＵ２６が算出し、その算出値に従い駆動回路２８が絞り兼用シヤッター２２を駆動する。また、測光結果によっては、撮影補助光としてストロボ２４を発光させる。

【００１８】撮像素子３０は、撮影レンズ２０及び絞り兼用シヤッタ２２による被写体の光学像を電気信号に変換する。撮像素子３０としてインターレース読み出し型ＣＣＤイメージ・センサを用いた場合、絞り兼用シャッタ２２を設けることにより、転送中に光が入射して信号

6

電荷に悪影響を与えるのを防止できる。駆動回路３４はタイミング信号発生回路３２の出力を増幅し、撮像素子３０を駆動する。なお、タイミング信号発生回路３２は、信号処理制御用ＣＰＵ４２により制御されている。

【００１９】このようにして駆動された撮像素子３０の出力は、前置処理回路３６に入力される。前置処理回路３６は、撮像素子３０の出力に含まれる低域ノイズをＣＤＳ処理により除去すると共に、Ａ／Ｄ変換器３８のダイナミック・レンジを有効活用できるように非線形処理する。前置処理回路３６の出力はＡ／Ｄ変換器３８によりディジタル信号に変換され、メモリ・バス制御回路４８に印加される。

【００２０】メモリ・バス制御回路４８は、信号処理用ＣＰＵ４２の制御下で、Ａ／Ｄ変換器３８の出力をバッファ・メモリ４０に一旦蓄積した後、撮像素子３０の色フィルター構成等によって決まる所定の順序で読み出す。読み出された撮影画像データはインターフェース５０を介して記録媒体１２に印加され、記録される。

【００２１】次に、本実施例の特徴的な動作を説明する。本実施例では、文字認識機能ソフトウエアと画像合成機能ソフトウエアをホストコンピュータ１６から外部インターフェースコントローラ８０を介して拡張カード１４のプログラムＲＡＭ９４に書き込む。高速演算可能なプロセッサーとしてＲＩＳＣ型ＣＰＵを用いているが、もちろんＣＩＳＣ型ＣＰＵなど他のプロセッサを用いてもよい。

【００２２】図３及び図４は全体として、本実施例における信号処理制御用ＣＰＵ４２及びＣＰＵ４２により制御される機構部・操作部制御用ＣＰＵ２６の動作フローチャートを示す。図３及び図４を参照して、本実施例の動作を説明する。

【００２３】撮影者の撮影開始の操作により、撮影が開始し（Ｓ１）、先ず、レンズ系をワイド端に移動するとともに（Ｓ２）、被写体像の文書領域を抽出する（Ｓ３）。文書領域の抽出の結果、文書領域が撮像面の全面にわたって存在するか否かを判別し（Ｓ４）、文字領域が撮像面の一部にとどまる場合（Ｓ４）、レンズ系を制御して文字領域の水平方向又は垂直方向のいずれか一方が撮像面いっぱいになるまでズーミングする（Ｓ１０～Ｓ１３，Ｓ６～Ｓ８）。具体的には、先ず長手方向で文字領域が一杯になるように拡大して（Ｓ１０）、認識可能な大きさか否かを判断する（Ｓ１１）。認識可能ならば、撮影画像を記憶する（Ｓ１４）。ここで記憶した撮影画像は、例えば、図５に示すように、原稿に対して撮像面Ａのような関係であって、被写体文書全体を含むものになっている。

【００２４】Ｓ１１で認識不可能な場合、レンズ系を制御して、短手方向で文字列が撮像面いっぱいになるようにズーミングする（Ｓ１２）。その結果の撮影画像の文字の大きさが認識可能か否かを判別する（Ｓ１３）。判

別の結果、認識が可能であれば（Ｓ１３）、画像を記憶する（Ｓ９）。ここで記憶される画像は、例えば、図５に示すように、原稿に対して撮像面Ｂのような関係になっている。

【００２５】また、抽出した文書領域が撮像面全面にわたっている場合（Ｓ４）、文字の大きさから文字認識が可能か否かを判断し（Ｓ５）、認識可能ならば撮影画像を記憶する（Ｓ３９）。ここで記憶される画像は、例えば、図５に示すように、原稿の一部のみを含む撮像面Ｃのようなものになっている。

【００２６】Ｓ９で記憶された画像は、被写体原稿の一部のみを含むものであるので、残りの文書の撮影を禁止する操作がなされているか否かを調べる（Ｓ１５）。撮影禁止の操作がなされていなければ（Ｓ９）、撮影を続行し、撮影画像の動きベクトルによりカメラが動いた方向と移動量を検出し（Ｓ１６）、前過程において記憶した画像に対して現時点で撮影している画像の位置関係を求める。求めた位置関係から現撮影画像のうち前過程で既に記憶されている箇所をファインダー又はモニタに撮影画像とともに重複箇所が解る様に表示する（Ｓ１７）。

【００２７】重複箇所の検出方法としては、例えば次のようにする。即ち、図６に示すように、動き検出用に撮影画像内を領域分割した上で、分割領域の内の複数個の注目画素点（ａ，ｂ，ｃ，ｄ）と撮像面の画角を決める境界線までの位置情報を予め記憶しておく。図７に示すように複数画像（第１の撮影画像と第２の撮影画像）間における注目画素点の移動量及び移動方向（例えば、ａからａ’、及びｂからｂ’）を算出して複数画像間における画角境界線の位置関係を求め、画像間の画角境界線により囲まれた部分（図７では斜線部分）を重複箇所とする。

【００２８】続いて、前過程で記憶した画像と新たに撮影した画像とを位置関係及び重複箇所をつなげるように画像合成して、その合成画像を記憶又は記録し（Ｓ１８）、文書の残りがなくなるまで、Ｓ１６～Ｓ８を繰り返す（Ｓ１５）。

【００２９】文字認識に必要な文字画像を取り込んだら（Ｓ１３又はＳ１５）、Ｓ１４又はＳ１８で記憶された画像の文字認識を実行する（Ｓ１９）。文字認識結果は、使用者の指示に従い、記録媒体１２に記録されるか、又は外部インターフェースにより外部に出力される。

【００３０】なお、文字の大きさが認識可能なまでに大きくならない内に、レンズ系がテレ端に到達した場合（Ｓ６）、認識不可能を警告して、使用者に被写体への接近を促す（Ｓ２１）。

【００３１】被写体の文字認識を終了する操作があれば（Ｓ２２）、終了する。

【００３２】本実施例では、撮影画像を随時に画像合成するので、合成のための画像間の位置情報量が比較的少なくなり、画像間の位置管理が容易になるという効果がある。

【００３３】図８及び図９は、本実施例の第２の動作フローチャートを示す。

【００３４】撮影者の撮影開始の操作により、撮影が開始し（Ｓ３１）、先ず、レンズ系をワイド端に移動するとともに（Ｓ３２）、被写体像の文書領域を抽出する（Ｓ３３）。文書領域の抽出の結果、文書領域が撮像面の全面にわたって存在するか否かを判別し（Ｓ３４）、文字領域が撮像面の一部にとどまる場合（Ｓ３４）、レンズ系を制御して文字領域の水平方向又は垂直方向のいずれか一方が撮像面いっぱいになるまでズーミングする（Ｓ４２～Ｓ４７，Ｓ３７～Ｓ４０）。具体的には、先ず長手方向で文字領域が一杯になるように拡大して（Ｓ４２）、その状態で文字認識を実行し（Ｓ４３）、文字認識が可能か否かを判別し（Ｓ４４）、認識可能ならば認識結果を記憶する（Ｓ４８）。ここで記憶した認識結果は、例えば、図５において原稿に対して撮像面Ａのような関係であって、被写体文書全体の認識結果になっている。

【００３５】Ｓ４４で認識不可能な場合、レンズ系を制御して、短手方向で文字列が撮像面いっぱいになるようにズーミングする（Ｓ４５）。その状態で文字認識を実行し（Ｓ４６）、文字認識可能か否かを判別する（Ｓ４７）。認識が可能であれば認識結果を記憶する（Ｓ４１）。ここで記憶される認識結果は、例えば、図５に示すように、原稿に対する撮像面Ｂを文字認識したものになっている。

【００３６】また、抽出した文書領域が撮像面全面にわたっている場合（Ｓ３４）、そのままで文字認識を実行し（Ｓ３５）、文字認識が可能か否かを判断する（Ｓ３６）。認識可能ならば認識結果を記憶する（Ｓ４１）。ここで記憶される認識結果は、例えば、図５に撮像面Ｃとして示すように、原稿の一部のみの認識結果になっている。

【００３７】Ｓ４１で記憶された認識結果は、被写体原稿の一部のみからなるものであるので、残りの部分の撮影を禁止する操作がなされているか否かを調べる（Ｓ４９）。撮影禁止の操作がなされていなければ（Ｓ４９）、撮影を続行し、撮影画像の動きベクトルによりカメラが動いた方向と移動量を検出し（Ｓ５０）、直前に文字認識した画像に対して現時点で撮影している画像の位置関係を求める。求めた位置関係から現撮影画像のうち前過程で既に文字認識されている部分との重複箇所が明確に分かるように、撮影画像をファインダー又はモニタに表示する（Ｓ５１）。

【００３８】現時点で撮影されている画像の文字認識を実行し（Ｓ５２）、前過程で記憶した認識結果と新たに得た認識結果との間で重複している箇所があるならば、

新たに得た認識結果から重複箇所を削除する（Ｓ５３）。例えば、図１０の（Ａ）に示すように、第１の撮影から第２の撮影へと移動があり、図６及び図７で説明したように複数画像間の境界線により囲まれる部分を求める。第１の撮影の認識結果と第２の撮影の認識結果がそれぞれ図１０（Ｂ）に示すように得られたとすると、重複箇所の情報をそれぞれの認識結果に付加する。新しい認識結果から重複文字を削除し、残った認識文字が無ければ、Ｓ４９に戻り（Ｓ５４）、残った認識文字があれば（Ｓ５４）、前過程で得られた認識結果に残りの認識文字を合成する。この合成の時に、重複箇所の情報を利用し、文章として正しくつながるように合成する。例えば、図１０（Ｂ）に対して、合成結果は、図１０（Ｃ）に示すようになる。

【００３９】被写体原稿の全部の文字認識が終了したら（Ｓ４８又はＳ４９）、認識結果は、使用者の指示に従い、記録媒体１２に記録されるか、又は外部インターフェースにより外部に出力される。

【００４０】なお、図３の場合と同様に、文字の大きさが認識可能なまでに大きくならない内に、レンズ系がテレ端に到達した場合（Ｓ３７）、認識不可能を警告して、使用者に被写体への接近を促す（Ｓ５７）。

【００４１】被写体の文字認識を終了する操作があれば（Ｓ５８）、終了する。

【００４２】図８及び図９に示す動作では、取り込んだ文字画像を随時に文字認識するので、実質的にデータを高圧縮していることになり、システム内のデータ記憶容量が少なくて済む。換言すると、大量のデータを扱えるという利点がある。

【００４３】図４におけるＳ９～Ｓ１８及び、図９におけるＳ４１～Ｓ５５における、撮影画像と記憶画像又は文字認識結果の変化を、図１１～図１６を参照して、説明する。図１１は原稿であり、図１２は１回目の撮影による文字領域（Ａ）とその記憶画像又は認識結果（Ｂ）、図１３は２回目の撮影による文字領域（Ａ）とその記憶画像又は認識結果（Ｂ）、図１４は３回目の撮影による文字領域（Ａ）とその記憶画像又は認識結果（Ｂ）、図１５は４回目の撮影による文字領域（Ａ）とその記憶画像又は認識結果（Ｂ）、図１６は採集的な記憶画像又は認識結果を示す。

【００４４】図１１に示す原稿に対して、１回目の撮影で入力された文字領域部分が、図１２（Ａ）に示すようになっているとき、記憶される撮影画像又は認識結果は、文字認識誤りが無いとして、図１２（Ｂ）に示すように、図１２（Ａ）と同じである。２回目の撮影では１回目の撮影より一部重複して右側を撮影しており、ファインダ又はモニタには、図１３（Ａ）に示すように重複箇所が少し暗転して（又は着色されて）表示される。この第２の撮影により、記憶画像又は認識結果は図１３（Ｂ）のようになる。図１３（Ｂ）では、分かりやすいように、前の撮影（第１の撮影）による画像（又は認識結果）部分を点線で囲んである。点線で囲んだ部分に続いて、第２の撮影で得た新規画像（又は新規な文字認識結果）を合成する。

【００４５】同様に、３回目の撮影により、ファインダ又はモニタには、図１４（Ａ）に示すような画像が表示され、合成画像又は認識結果は、図１４（Ｂ）に示すようになる。４回目の撮影により、ファインダ又はモニタには、図１５（Ａ）に示すような画像が表示され、合成画像又は認識結果は、図１５（Ｂ）に示すようになる。図１４（Ｂ）及び図１５（Ｂ）でも、直前までの合成画像又は認識結果を点線で囲んで示してある。

【００４６】最終的な合成画像又は認識結果は図１６に示すようになり、図１１に示す原稿と同じになる。

【００４７】図１７及び図１８は全体として、本実施例の第３の動作フローチャートを示す。

【００４８】撮影者の撮影開始の操作により、撮影が開始し（Ｓ６１）、先ず、レンズ系をワイド端に移動する（Ｓ６２）。被写体像から文書領域を抽出し（Ｓ６３）、縦書きか横書きかを判別する（Ｓ６４）。通常の文書は、行間隔を開けて書かれるものであり、行方向は撮像面に対して大旨水平方向又は垂直方向に合致する。縦書き横書きの判別方法としては、例えば、水平方向又は垂直方向で、信号成分の変化する度合いの少ない方向を行方向とすればよい。続いて、撮影画像上での文字の大きさから、文字認識可能な大きさになる撮影画角、画角割り及びその撮影順をファインダ又はモニタ画面に表示する（Ｓ６５）。例えば、図１９に示す原稿に対して、図２０に示すように、撮影画角、画角割り及びその撮影順を表示する。

【００４９】Ｓ６５で設定した画角及び撮影範囲になるようにレンズ系をテレ側に制御し（Ｓ６６）、テレ端に到達する前に、認識可能な大きさになれば（Ｓ６７）、撮影文字行を正しく撮像面の水平又は垂直に並行になるように、図２１に点線で示すように、ファインダ又はモニタに１又は２以上の基準線を表示する。基準線を縦に引くか又は横に引くかは、Ｓ６４で縦書き・横書き検出した結果に従う。また、複数の基準線を引く場合、その基準線の間隔は行間隔に合わせて設定されるが、その基準線間隔も、Ｓ６４での検出結果により設定される。これにより、撮影画像内で文字行が水平又は垂直になるように文書領域を撮影できる。

【００５０】複数画像の位置情報を記憶するメモリのアドレス（二次元座標）をリセットし（Ｓ７１）、第一の撮影画像を記憶し（Ｓ７２）、その画像のアドレス（二次元座標位置）を記憶する（Ｓ７３）。

【００５１】残りの文書（又は領域）を継続して撮影しない様な指示がなされているか否かを判別し（Ｓ７４）、撮影中止の指示がなければ、撮影を続行する。即ち、前過程で記憶した画像と現在の撮影画から、現在の

撮影画の移動量と移動方向を検出する（Ｓ７５）。検出された移動量及び移動方向が、新規な画像を取り込むことになると判断される閾値である所定量に達しているかを判別し（Ｓ７６）、移動量が所定量に達していなければ、Ｓ７４，Ｓ７５，Ｓ７６をループし、移動量が所定値に達するまで待ち状態となる。移動量が所定値以上あるときは（Ｓ７６）、新規な画像が取り込まれていることになり、移動量と移動方向の検出結果から現撮影画像と記憶画像との重畳部分を表示し（Ｓ７７）、重畳部分の量（例えば、文字列などの列数や行数あるいは文字数）が所定値以上あるか否かを判別し（Ｓ７８）、重なる部分が少ないときは、適切な位置関係で画像を合成できないおそれがあるので、移動し過ぎを警告し（Ｓ７９）、Ｓ７４に戻る。所定量の重なりがあるとき（Ｓ７８）、移動量・移動方向から直前に撮影した画像に対する位置情報を画像アドレスとしてカウントし（Ｓ８０）、そのアドレスに画像を記憶し（Ｓ８１）、その画像アドレスを記憶する（Ｓ８２）。

【００５２】残り文書の撮影中止の指示があると（Ｓ７４）、撮影動作を停止する。前過程までに記憶した画像が複数有るかいなかを判別し（Ｓ８３）、複数画像が存在するときは、それらの画像を、それぞれの画像アドレスに従って合成する（Ｓ８４）。画像の重複部分は、一定の基準に従い、例えば先に説明したようにして削除する。合成画像又は単一画像に対し文字認識を実行し（Ｓ８５）、認識結果を記録媒体に記録する（Ｓ８６）。

【００５３】前過程で撮影した原稿とは別の原稿を撮影する場合、Ｓ６２に進んで、上記プロセスを繰り返し（Ｓ８７）、そうでない場合には、終了する。

【００５４】図１７及び図１８に示す動作では、原稿を分割撮影する必要性とその画角、撮影回数及び撮影順序を表示するので、使用者は、被写体である原稿の撮影範囲及び撮影順などを視覚的にかつ容易に把握できるという効果がある。また、文書の縦書き・横書き判別を行い、その判別結果に合わせて基準線を表示することにより、使用者は文章行が水平又は垂直になるように被写体原稿を撮影でき、高い文字認識率を達成しやすくなる。複数画像間の移動量が所定量以下である時は画像を取り込まないので、画像又は認識結果データの記憶容量が少なくて済む。画像間の重複量を所定量以上に保つ様にすることにより、合成のための情報が多くなり、より正確に画像合成できる。画像間の移動量及び重複量を文字を単位とすることにより、人間の判断基準に合致した合成処理となり、使用感が向上する。

【００５５】

【発明の効果】以上の説明から容易に理解できるように、本出願に係る発明によれば、文字認識の操作性を向上し、認識精度を高めることができる。更には、被写体原稿から任意の距離にあって、任意の大きさの被写体原稿の文字認識が可能になる。また、使用者は被写体原稿

を取り込むにあたって目視によって文字を追うかの様な自然な動かし方で画像を取り込み、画像入力のためのスキャニングの仕方に気遣う必要がなくなり、使い勝手が良くなる。

【図面の簡単な説明】

【図１】　本発明の一実施例の概略構成ブロック図である。

【図２】　図１の拡張カード１４の内部の概略構成ブロック図である。

【図３】　本実施例の第１の動作フローチャートの一部である。

【図４】　本実施例の第１の動作フローチャートの一部である。

【図５】　原稿と撮影範囲（又は撮像面の画像）との関係の説明図である。

【図６】　画角内の注目画素点の説明図である。

【図７】　２回の撮影における移動量及び移動方向の説明図である。

【図８】　本実施例の第２の動作フローチャートの一部である。

【図９】　本実施例の第２の動作フローチャートの一部である。

【図１０】　図８及び図９に示す動作における文字認識結果の合成プロセスの説明図である。

【図１１】　被写体原稿の一例である。

【図１２】　図１１に示す原稿に対する、１回目の撮影による撮影画像と合成画像又は認識結果である。

【図１３】　図１１に示す原稿に対する、２回目の撮影による撮影画像と合成画像又は合成認識結果である。

【図１４】　図１１に示す原稿に対する、３回目の撮影による撮影画像と合成画像又は合成認識結果である。

【図１５】　図１１に示す原稿に対する、４回目の撮影による撮影画像と合成画像又は合成認識結果である。

【図１６】　図１１に示す原稿に対する、最終的な合成画像又は合成認識結果である。

【図１７】　本実施例の第３の動作フローチャートの一部である。

【図１８】　本実施例の第３の動作フローチャートの一部である。

【図１９】　被写体原稿の一例である。

【図２０】　Ｓ６５での画角目安表示例である。

【図２１】　Ｓ７０での基準線表示例である。

【符号の説明】

１０：ディジタル電子カメラ本体　１２：記録媒体　１４：拡張カード　１６：ホストコンピュータ　２０：撮影レンズ　２２：絞り兼用シャッタ　２４：ストロボ　２６：機構部・操作部制御ＣＰＵ　２８：機構部駆動回路　３０：撮像素子　３２：タイミング信号発生回路　３４：撮像素子駆動回路　３６：前置処理回路　３８：Ａ／Ｄ変換器　４０：バッファ・メモリ　４２：信号処

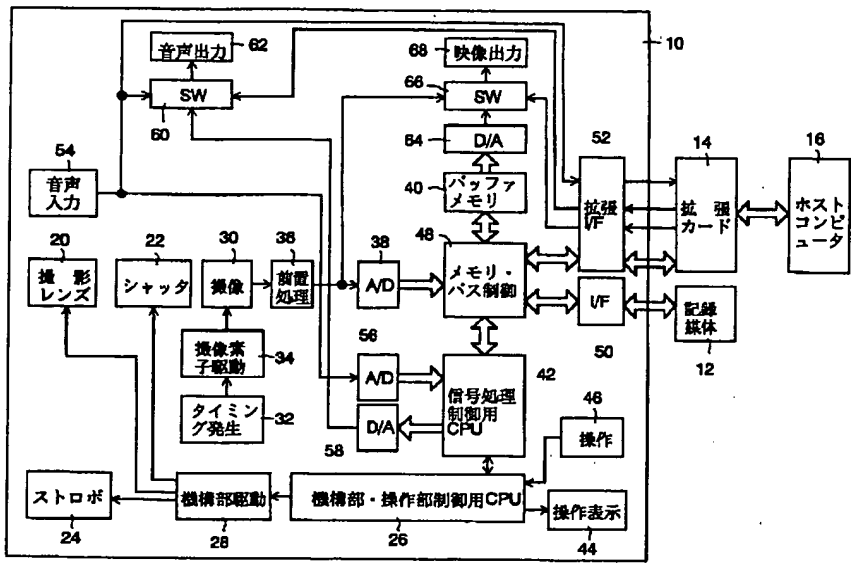
13

理系制御用ＣＰＵ　４４：操作表示装置　４６：操作装置　４８：メモリ・バス制御回路５０：インターフェース　５２：拡張インターフェース　５４：音声入力回路　５６：Ａ／Ｄ変換器　５８：Ｄ／Ａ変換器　６０：スイッチ　６２：音声出力装置　６４：Ｄ／Ａ変換器　６６：スイッチ　６８：映像出力装置　７０：拡張バス・インターフェース　７２：撮像信号処理回路　７４：間 *

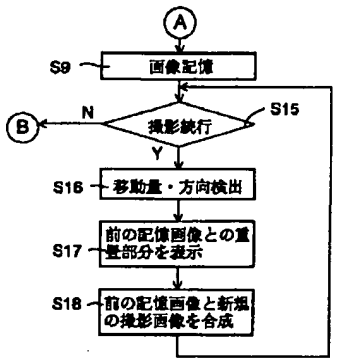
14

*引き処理回路　７６：バッファ・メモリ　７８：バス・コントローラ　８０：外部Ｉ／Ｆコントローラ　８２：動画圧縮伸長回路　８４：ビデオ・エンコーダ　８６：Ｄ／Ａ変換器８８：Ａ／Ｄ変換器　９０：Ｄ／Ａ変換器　９２：ＲＩＳＣ型ＣＰＵ　９４：プログラムＲＡＭ　９６：フラッシュＲＯＭ

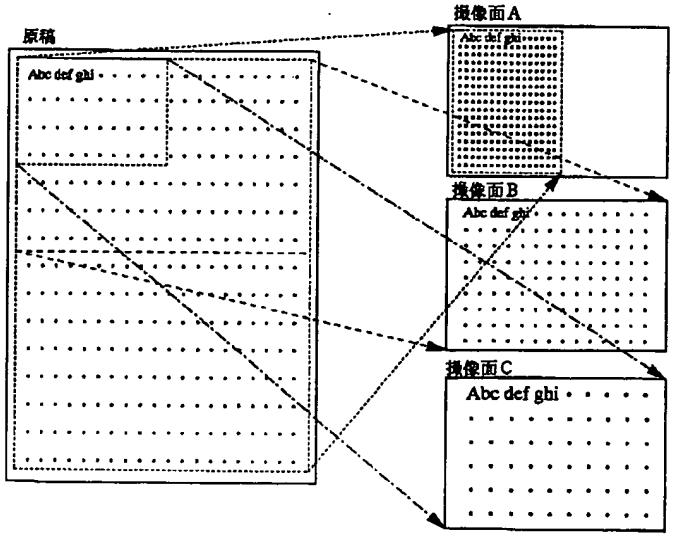
【図１】



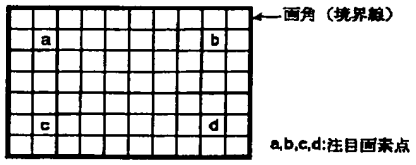
【図４】



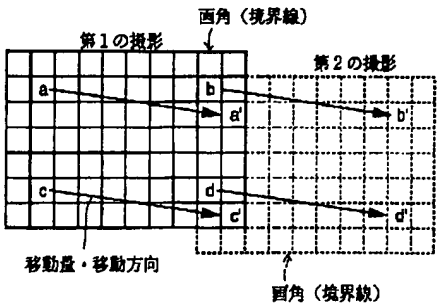
【図５】



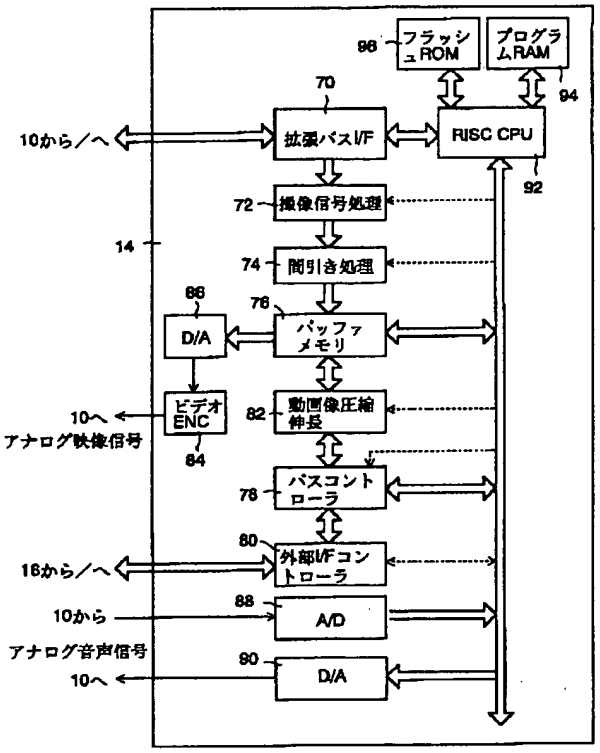
【図６】



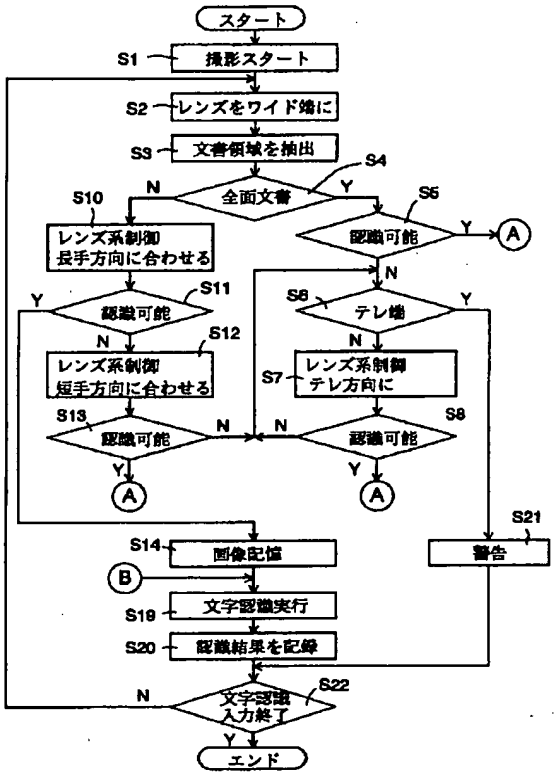
【図７】



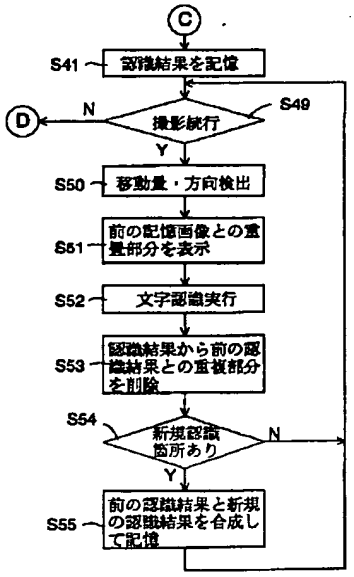
【図２】



【図３】



【図９】



【図１１】

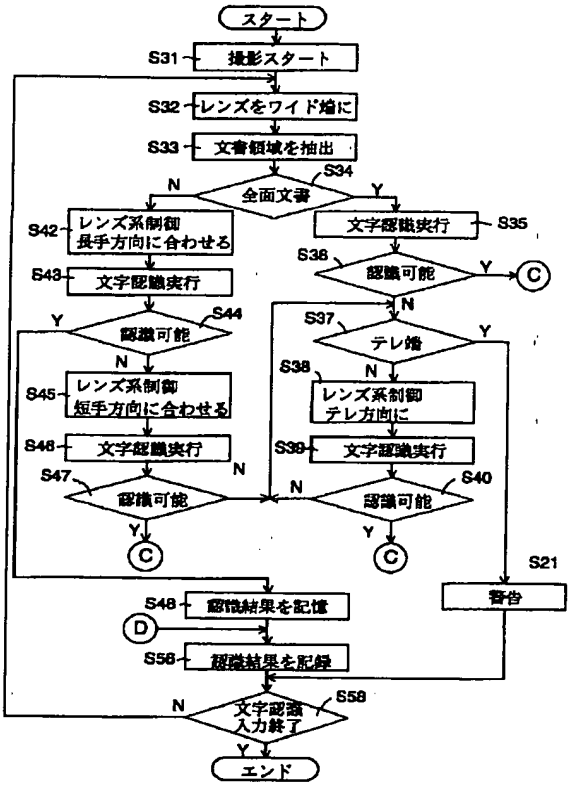
原稿

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑおあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑお

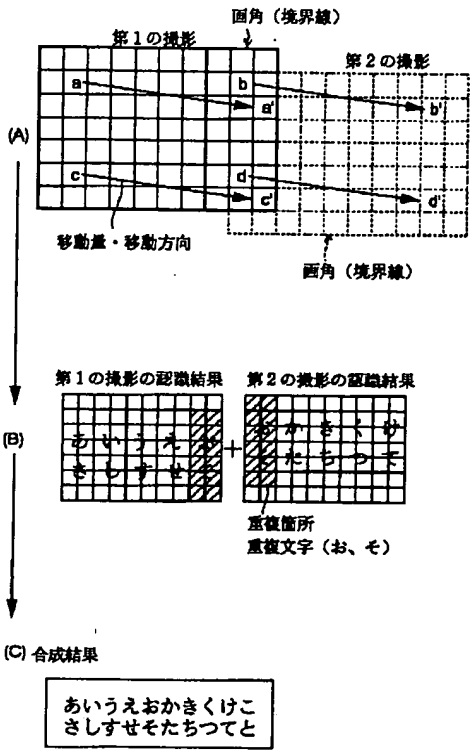
・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・

・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・

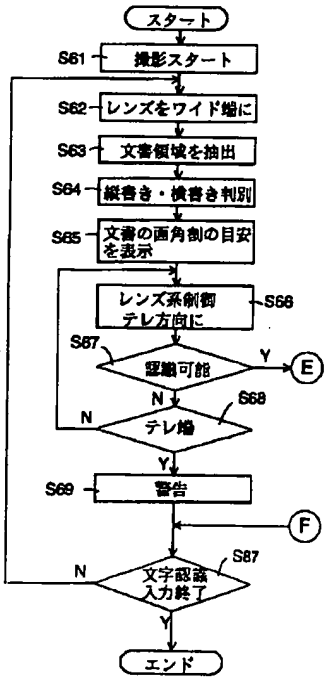
【図８】



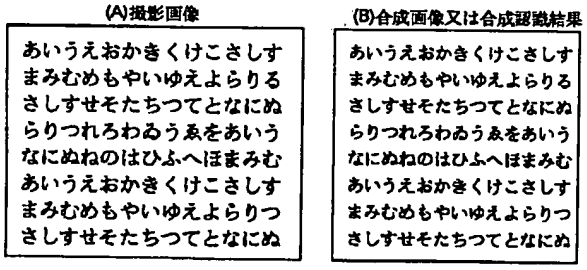
【図１０】



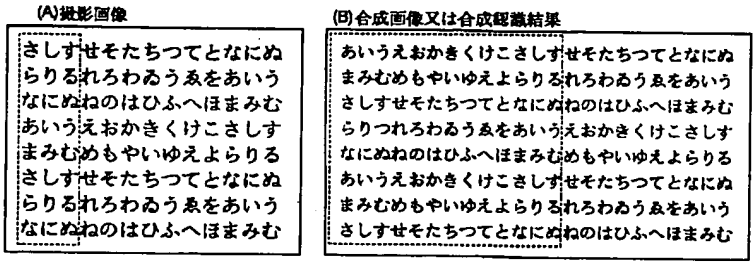
【図１７】



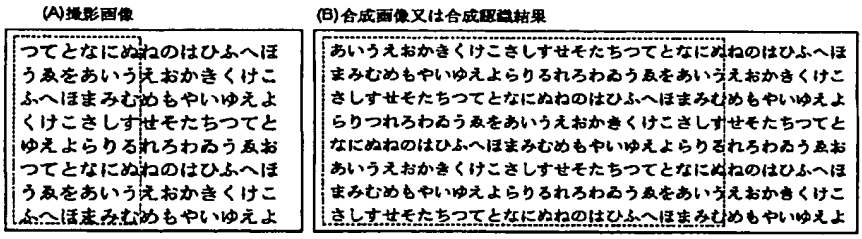
【図１２】



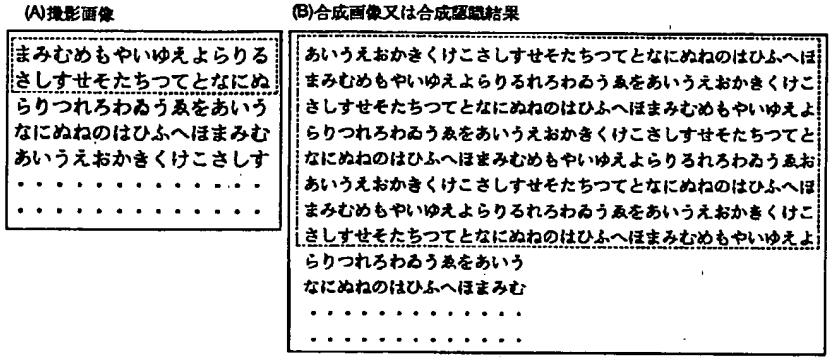
【図１３】



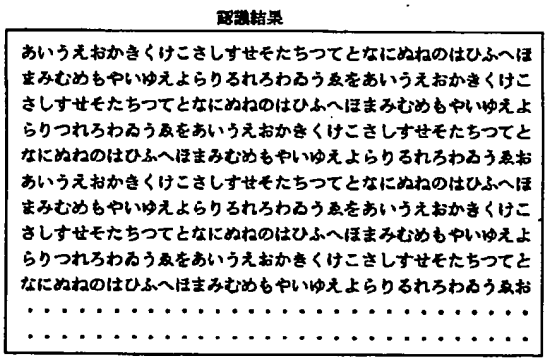
【図１４】



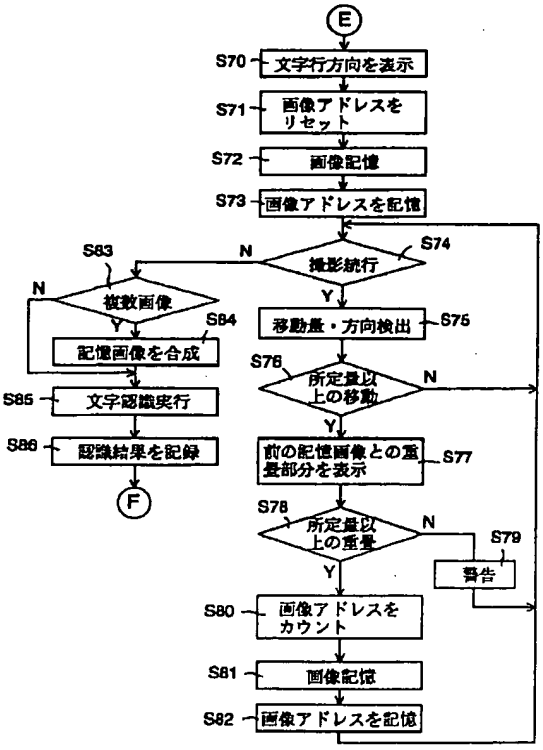
【図１５】



【図１６】



【図１８】

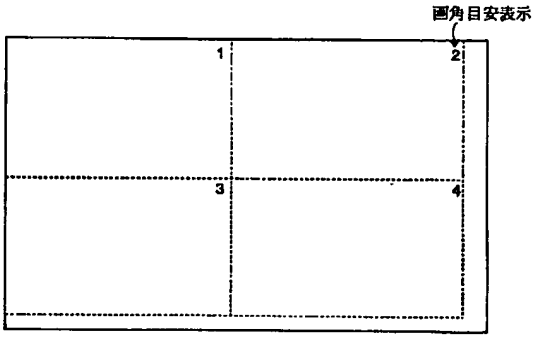


【図１９】

原稿

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑおあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑお

【図２０】



【図２１】

あいうえおかきくけこさしす
まみむめもやいゆえよらりる
さしすせそたちつてとなにぬ
らりつれろわゐうゑをあいう
なにぬねのはひふへほまみむ
あいうえおかきくけこさしす
まみむめもやいゆえよらりる
さしすせそたちつてとなにぬ

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-220025

(43)Date of publication of application : 18.08.1995

(51)Int.Cl. G06K 9/22
G06T 1/00
G06K 9/20
H04N 1/387

(21)Application number : 06-009806

(22)Date of filing : 31.01.1994

(71)Applicant : CANON INC

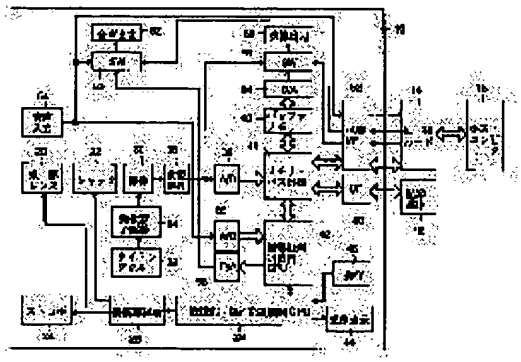
(72)Inventor : HORI MASASHI

(54) PICTURE PROCESSOR

(57)Abstract:

PURPOSE: To easily recognize characters from an input picture from a camera.

CONSTITUTION: An object document is photographed divlsionally in plural areas. An extended card 14 is provided with picture synthesizing function software for synthesis of divided pictures and character recognizing function software which converts character pictures to character codes. A memory bus control circuit 48 is provided with the inter-picture movement detecting function. Plural divisionally photographed pictures are synthesrzed, and characters are otherwise recognized. Otherwise they are subjected to character recognition and inter- picture movement is referred to synthesize the character recognition results of different pictures into a sentence.



LEGAL STATUS

[Date of request for examination] 27.12.1999

[Date of sending the examiner's decision of rejection] 27.11.2001

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The image processing system which characterizes by to have a conversion means change a photographic subject image into an electrical signal continuously, a motion detection means detect a motion of the image in the conversion side of the conversion means concerned, a synthetic means compound two or more images which twist for the conversion means concerned according to the motion detected by the motion detection means concerned, and a character-recognition means change into a character code the alphabetic character image in the synthetic image compounded by the synthetic means concerned.
[Claim 2] Furthermore, the image processing system according to claim 1 which established a display means to display a photography image that a duplication detection means to detect the duplication part between two or more photography images twisted for the above-mentioned image pick-up means according to the detection result of the above-mentioned motion detection means, and a duplication part and the other part are discriminable.
[Claim 3] Furthermore, the image processing system according to claim 1 made into the object of image composition of the photography image with which it has a comparison means to compare a predetermined value for the detection result of the above-mentioned motion detection means, and the motion beyond the predetermined value concerned has the above-mentioned image composition means.
[Claim 4] Furthermore, the image processing system according to claim 1 with which an amount calculation means of duplications to compute the amount of duplications from a new photography image is provided, and the above-mentioned image composition means carries out image composition of the new photography image concerned when the amount of duplications concerned is beyond a predetermined value.
[Claim 5] Furthermore, it is the image processing system according to claim 2 which has a character spacing detection means to detect character spacing from a photography image, and detects the amount of duplications of the image which should compound the above-mentioned duplication detection means per alphabetic character.
[Claim 6] The image processing system according to claim 1 which the above-mentioned motion detection means searches for the physical relationship of two or more field angles according to the physical relationship of the reference point of motion detection, and a photography field angle from the movement magnitude and the migration direction of a reference point of [between photography images], and the above-mentioned image composition means detects the duplication part of two or more images from the physical relationship between field angles, removes a duplication part, and carries out image composition.
[Claim 7] A conversion means to change a photographic subject image into an electrical signal continuously, and a motion detection means to detect a motion of the image in the conversion side of the conversion means concerned, An alphabetic character signal transduction means to change into text the alphabetic character image contained in each image changed by the conversion means concerned, The image processing system characterized by having an alphabetic character merge means to compound the

alphabetic character recognized by the alphabetic character signal transduction means concerned, according to the motion detected by the motion detection means concerned.
[Claim 8] Furthermore, the image processing system according to claim 7 which established a display means to display a photography image that a duplication detection means to detect the duplication part between two or more photography images twisted for the above-mentioned image pick-up means according to the detection result of the above-mentioned motion detection means, and a duplication part and the other part are discriminable.
[Claim 9] The image processing system according to claim 7 with which the above-mentioned alphabetic character merge means has a common section detection means to detect the same character recognition part from the character code data of two or more photography images twisted for the above-mentioned character recognition means, and carries out text composition of the character code data of two or more photography images based on the detection result of the common section detection means concerned.
[Claim 10] Furthermore, the image processing system according to claim 7 which sets the character recognition result of the photography image with which it has a comparison means to compare a predetermined value for the detection result of the above-mentioned motion detection means, and the motion beyond the predetermined value concerned has the above-mentioned alphabetic character merge means as the synthetic object.
[Claim 11] Furthermore, it is the image processing system according to claim 8 which has a character spacing detection means to detect character spacing from a photography image, and detects the amount of duplications of the image which should compound the above-mentioned duplication detection means per alphabetic character.
[Claim 12] The image processing system according to claim 8 which the above-mentioned motion detection means searches for the physical relationship of two or more field angles according to the physical relationship of the reference point of motion detection, and a photography field angle from the movement magnitude and the migration direction of a reference point of [between photography images], the above-mentioned alphabetic character merge means detects the duplication part of the recognition result of two or more images from the physical relationship between field angles, removes a duplication part, and carries out text composition of the character code.
[Claim 13] The image processing system characterized by having a conversion means to have a variable power function and to change an optical image into an electrical signal continuously, an alphabetic character field detection means to detect the alphabetic character field in the optical image concerned, and the control means that operates the variable power function concerned based on the detection result of the alphabetic character field detection means concerned.
[Claim 14] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, and a distinction means to distinguish whether character recognition is possible from a graphic size, and controls the above-mentioned variable power function in the magnitude which can be recognized at the time of a graphic size in which character recognition is impossible.
[Claim 15] The image processing system according to claim 14 which is expanded to the maximum, and outputs predetermined warning when character recognition is still more nearly improper.
[Claim 16] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, a distinction means to distinguish whether character recognition is possible from a graphic size, and a dilation ratio calculation means to compute the dilation ratio used as the character size in which character recognition is possible.
[Claim 17] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, a distinction means to distinguish whether character recognition is possible from a graphic size, and a dilation ratio calculation means to compute the dilation ratio used as the character size in which character recognition is possible, and displays the photography field angle at the time of the expansion to a photography image with one or more photography images.

h g cg b eb cg e e h g

4

[Claim 18] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, a distinction means to distinguish whether character recognition is possible from a graphic size, and a dilation ratio calculation means to compute the dilation ratio used as the character size in which character recognition is possible, and displays the division photography field by the photography field angle at the time of photomacrography with a photography image.
[Claim 19] Furthermore, the image processing system according to claim 13 which displays the datum line which has a character spacing detection means to detect character spacing from a photography image, and an in-every-direction distinction means to distinguish columnar-writing lateral writing of a photographic subject manuscript from character spacing, and met vertical and horizontal either by the line writing direction of an alphabetic character with a photography image.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to an image processing system.
[0002]
[Description of the Prior Art] In character recognition, conventionally, a printer graphic is first image-data-ized with image input means, such as an image scanner, and an alphabetic character image is changed into a character code with the character recognition software on a computer after that. As an image input means, there is a digital electronic camera other than an image scanner. The digital electronic camera is suitable, when a printing side is not superficial, or when carrying out the image input of the big thing which cannot be read by the image scanner.
[0003]
[Problem(s) to be Solved by the Invention] When using a digital electronic camera as an image input means for character recognition, a graphic size [in / with a natural thing / a photography image] must be large to extent in which character recognition is possible. In order to photo an alphabetic character in the magnitude in which character recognition is possible, when dividing a photographic subject manuscript into multiple times and photoing it, after capturing two or more images and carrying out character recognition of each image, text editing of each character recognition result will be carried out to original sequence with a word processor, and there is a fault of taking complicated actuation and great time amount.
[0004] This invention aims at showing the image processing system which cancels such un-arranging.
[0005] This invention aims at offering the image processing system which raised operability again.
[0006] This invention aims at offering further the image processing system which raised the precision of character recognition.
[0007]
[Means for Solving the Problem] A conversion means by which the image processing system concerning the 1st invention changes a photographic subject image into an electrical signal continuously, A motion detection means to detect a motion of the image in the conversion side of the conversion means concerned, It is characterized by having a synthetic means to compound two or more images twisted for the conversion means concerned, and a character recognition means to change into a character code the alphabetic character image in the synthetic image compounded by the synthetic means concerned, according to the motion detected by the motion detection means concerned.
[0008] A conversion means by which the image processing system concerning the 2nd invention changes a photographic subject image into an electrical signal continuously, A motion detection means to detect a motion of the image in the conversion side of the conversion means concerned, It is characterized by having an alphabetic character signal transduction means to change into text the alphabetic character image contained in each image changed by the conversion means concerned, and an alphabetic character merge means to compound the alphabetic character recognized by the alphabetic character signal transduction means concerned according to the motion detected by the motion detection

6

means concerned.
[0009] The image processing system concerning the 3rd invention has a variable power function, and is characterized by having a conversion means to change an optical image into an electrical signal continuously, an alphabetic character field detection means to detect the alphabetic character field in the optical image concerned, and the control means that operates the variable power function concerned based on the detection result of the alphabetic character field detection means concerned.
[0010]
[Function] The correspondence to the manuscript of the magnitude of arbitration is attained by adding a character recognition function to image pick-up equipment. Moreover, since the graphic size of a photographic subject manuscript is detected at the time of photography, it distinguishes whether character recognition is possible and it carries out photomacrography to the magnitude which can be recognized suitably, a recognition rate can be raised. Furthermore, since the physical relationship between two or more images accompanying a motion of a photography image is detected at any time and two or more images or the recognition result of those is image-compounded or text compounded based on a detection result, it is not necessary to carry out complicated actuation.
[0011]
[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.
[0012] Drawing 1 shows the outline configuration block Fig. of one example of this invention. In drawing 1 , 10 is an expansion card in which the body of a digital electronic camera and 12 possess the record media (memory card or a hard disk drive unit of PCMCIA specification etc.), and 14 possesses a character recognition function. An expansion card 14 can connect or communicate also with a host computer 16.
[0013] In the body 10 of a camera, CPU by which the diaphragm combination shutter which a taking lens and 22 extract 20 and serves both as a function and a shutter function, and 24 control a stroboscope, and 26 controls the device section and a control unit, and 28 are drive circuits which drive the device section. The image sensor from which 30 changes the optical image of the photographic subject by the taking lens 20 into an electrical signal, The timing signal generating circuit which generates a timing signal required in order that 32 may operate an image sensor 30, The image sensor drive circuit where 34 drives an image sensor 30 according to the timing signal from the timing signal generating circuit 32, The front-end processing circuit equipped with the nonlinear amplifying circuit which carries out nonlinear magnification before the CDS circuit where 36 removes a noise from the output of an image sensor 30, and A/D conversion, and 38 are A/D converters which change the analog output of the front-end processing circuit 36 into a digital signal. CPU for signal-processing system control by which 40 controls buffer memory and 42 controls each signal-processing section, the actuation display with which 44 displays the information for actuation assistance and the condition of a camera, and 46 are the operating sets for controlling the body 10 of a camera from the outside. 48 is a memory bus control circuit which controls a transfer of image data and voice data, and possesses the function to also detect a motion vector at the time of a seriography, in this example while it controls writing and read-out of buffer memory 40.
[0014] The interface whose 50 connects a record medium 12 to a body 10, and 52 are extended interfaces which connect an expansion card 14.
[0015] The A/D converter which 54 digitizes voice input circuits, such as a microphone, and 56 digitizes the analog output of the voice input circuit 54, and is impressed to CPU42 for signal-processing control, the D/A converter with which 58 analog-izes the digital sound signal from CPU42 for signal-processing control, and 60 are switches which choose the sound signal from the output of the voice input circuit 54, the output of D/A converter 58, or the extended interface 52, and are impressed to an audio output device 62. Although an audio output device 62 is generally a loudspeaker, you may be a voice output terminal. The D/A converter which changes into an analog video signal the image data 64 is remembered to be by buffer memory 38, and 66 are switches which choose the video-signal output of the front-end processing circuit 36, the video-signal output of D/A converter 64, or the video signal from an expansion card 52, and are impressed to the image output unit 68. Although the image output unit 68

is generally a graphic display device, you may be an image output terminal.
[0016] Drawing 2 shows the outline configuration block Fig. inside an expansion card 14. For an image pick-up digital disposal circuit and 74, as for buffer memory and 78, an infanticide processing circuit and 76 are [70 / an expansion bus interface (I/F) and 72 / a bus controller and 80] external I/F controllers. The D/A converter from which an animation compression expansion circuit and 84 change the image data from buffer memory 76 into a video encoder, and 82 changes 86 into an analog signal, the A/D converter with which 88 digitizes the analog sound signal from the body 10 of a camera, and 90 are D/A converters which change into an analog signal the voice data which should be outputted to the body 10 of a camera. The program RAM the RISC mold CPU in which a high-speed operation of 92 is possible, and 94 remember the program of the RISC mold CPU 92 of operation to be, and 96 are flash ROMs which memorize BIOS of the RISC mold CPU 92.
[0017] First, the original actuation as a digital electronic camera is explained briefly. When a photography person does actuation predetermined with an operating set 46, it will be in the condition which can be photoed and the device section and CPU26 for control unit control will control a lens system in the condition according to an intention of a photography person through the drive circuit 28. Under the present circumstances, photography conditions etc. are displayed on the actuation display 44, and the situation of a camera is told to a photography person. A non-illustrated photometry circuit measures the brightness of a photographic subject, the device section and CPU26 for control unit control compute the drawing value and shutter speed of the diaphragm combination shutter 22 according to this measured value, the drive circuit 28 extracts according to that calculation value, and the combination shutter 22 is driven. Moreover, a stroboscope 24 is made to emit light as a photography fill-in flash depending on a photometry result.
[0018] An image sensor 30 changes a taking lens 20 and the optical image of the photographic subject by the diaphragm combination shutter 22 into an electrical signal. When interlace read-out mold CCD series is used as an image sensor 30, it can prevent that light carries out incidence and has a bad influence during a transfer at a signal charge by forming the diaphragm combination shutter 22. The drive circuit 34 amplifies the output of the timing signal generating circuit 32, and drives an image sensor 30. In addition, the timing signal generating circuit 32 is controlled by CPU42 for signal-processing control.
[0019] Thus, the output of the driven image sensor 30 is inputted into the front-end processing circuit 36. While CDS processing removes the low-pass noise contained in the output of an image sensor 30, nonlinear processing of the front-end processing circuit 36 is carried out so that the dynamic range of A/D converter 38 can be used effectively. The output of the front-end processing circuit 36 is changed into a digital signal by A/D converter 38, and is impressed to the memory bus control circuit 48.
[0020] Under control of CPU42 for signal processing, the memory bus control circuit 48 is read in order of predetermined [which is decided by the color filter configuration of an image sensor 30 etc.], once accumulating the output of A/D converter 38 in buffer memory 40. The read photography image data is impressed and recorded on a record medium 12 through an interface 50.
[0021] Next, characteristic actuation of this example is explained. In this example, character recognition functional software and image composition functional software are written in the program RAM 94 of an expansion card 14 through the external-interface controller 80 from a host computer 16. Although the RISC mold CPU is used as a processor in which a high-speed operation is possible, of course, other processors, such as the CISC mold CPU, may be used.
[0022] Drawing 3 and drawing 4 show the operation flow chart of the device section and CPU26 for control unit control controlled by the objects CPU42 and CPU42 for signal-processing control in this example as a whole. Actuation of this example is explained with reference to drawing 3 and drawing 4 .
[0023] While photography begins (S1) and moving a lens system to a wide edge first by actuation of photography initiation of a photography person (S2), the document field of a photographic subject image is extracted (S3). As a result of the extract of a document field, zooming is carried out until it controls (S4) and a lens system and either of vertical fills an image pick-up side horizontally [an alphabetic character field], when it distinguishes whether a document field exists over the whole surface of an

image pick-up side and (S4) and an alphabetic character field remain in a part of image pick-up side (S10-S13, S6-S8). It specifically expands so that an alphabetic character field may fill with a longitudinal direction first (S10), and it judges whether it is the magnitude which can be recognized (S11). A photography image will be memorized if recognition is possible (S14). As shown in drawing 5 , to the manuscript, the photography image memorized here is relation like the image pick-up side A, and contains the whole photographic subject document.

[0024] When it cannot recognize by S11, a lens system is controlled, and zooming is carried out so that a character string may fill an image pick-up side with the direction of a short hand (S12). It distinguishes whether the graphic size of the photography image of the result can be recognized (S13). An image will be memorized if recognition is possible as a result of distinction (S13) (S9). The image memorized here has relation like the image pick-up side B to the manuscript, as shown in drawing 5 .

[0025] Moreover, when the extracted document field is crossing all over the image pick-up side, it judges whether character recognition is possible from (S4) and a graphic size (S5), and a photography image will be memorized if recognition is possible (S39). The image memorized here is a thing like the image pick-up side C containing some manuscripts, as shown in drawing 5 .

[0026] Since the image memorized by S9 contains some photographic subject manuscripts, it investigates whether actuation of forbidding photography of the remaining document is made (S15). If actuation of the ban on photography is not made, (S9) and photography are continued, the direction which the camera moved by the motion vector of a photography image, and movement magnitude are detected (S16), and the physical relationship of the image currently photoed at present to the image memorized in the last process is searched for. It displays so that a finder or a monitor may understand a duplication part for the part already memorized in the before process among the present photography images with a photography image from the physical relationship searched for (S17).

[0027] As the detection approach of a duplication part, it is performed as follows, for example. That is, as shown in drawing 6 , the positional information to the boundary line which determines two or more attention pixels of the division fields (a, b, c, d) and the field angle of an image pick-up side for motion detection after carrying out field division of the inside of a photography image is memorized beforehand. As shown in drawing 7 , the movement magnitude and the migration direction (for example, from a to a' and from b to b') of an attention pixel of [between two or more images (the 1st photography image and 2nd photography image)] are computed, the physical relationship of the field angle boundary line between two or more images is searched for, and the part (drawing 7 shadow area) surrounded by the field angle boundary line between images is made into a duplication part.

[0028] Then, S16-S8 are repeated until it carries out image composition of the image memorized in the last process, and the newly photoed image so that physical relationship and a duplication part may be connected, and it memorizes or records the synthetic image (S18) and the remainder of a document is lost (S15).

[0029] If an alphabetic character image required for character recognition is captured (S13 or S15), character recognition of the image memorized by S14 or S18 will be performed (S19). According to directions of a user, a character recognition result is recorded on a record medium 12, or is outputted outside by the external interface.

[0030] In addition, when a lens system arrives at a tele edge before becoming large, by the time it had recognized the graphic size (S6), it warns of a recognition impossibility and approach for a photographic subject is demanded from a user (S21).

[0031] It will end, if there is actuation which ends the character recognition of a photographic subject (S22).

[0032] In this example, since image composition of the photography image is carried out at any time, the amount of positional information between the images for composition decreases comparatively, and it is effective in the location management between images becoming easy.

[0033] Drawing 8 and drawing 9 show the 2nd operation flow chart of this example.

[0034] While photography begins (S31) and moving a lens system to a wide edge first by actuation of photography initiation of a photography person (S32), the document field of a photographic subject

image is extracted (S33). When it distinguishes whether a document field exists over the whole surface of an image pick-up side as a result of the extract of a document field (S34) and an alphabetic character field remains in a part of image pick-up side (S34), zooming is carried out until it controls a lens system and either of vertical fills an image pick-up side horizontally [an alphabetic character field] (S42-S47, S37-S40). It specifically expands so that an alphabetic character field may fill with a longitudinal direction first (S42), and character recognition is performed in the condition (S43), and it distinguishes whether character recognition is possible (S44), and a recognition result will be memorized if recognition is possible (S48). In drawing 5 , to the manuscript, the recognition result memorized here is relation like the image pick-up side A, and has brought a recognition result of the whole photographic subject document.

[0035] When it cannot recognize by S44, a lens system is controlled, and zooming is carried out so that a character string may fill an image pick-up side with the direction of a short hand (S45). Character recognition is performed in the condition (S46), and it distinguishes whether character recognition is possible (S47). A recognition result will be memorized if recognition is possible (S41). The recognition result memorized here is what carried out character recognition of the image pick-up side B over a manuscript, as shown in drawing 5 .

[0036] Moreover, when the extracted document field is crossing all over the image pick-up side (S34), it remains as it is, character recognition is performed (S35), and it judges whether character recognition is possible (S36). A recognition result will be memorized if recognition is possible (S41). The recognition result memorized here has brought some recognition results of a manuscript, as shown in drawing 5 as an image pick-up side C.

[0037] Since the recognition result memorized by S41 consists of some photographic subject manuscripts, it investigates whether actuation of forbidding photography of the remaining part is made (S49). If actuation of the ban on photography is not made (S49), photography is continued, the direction which the camera moved by the motion vector of a photography image, and movement magnitude are detected (S50), and the physical relationship of the image currently photoed at present to the image which carried out character recognition to just before is searched for. A photography image is displayed on a finder or a monitor so that the physical relationship searched for may show clearly a duplication part with the part by which character recognition has already been carried out in the before process among the present photography images (S51).

[0038] Character recognition of the image currently photoed at present is performed (S52), and if there is a part which overlaps between the recognition result memorized in the last process and the newly obtained recognition result, a duplication part will be deleted from the newly obtained recognition result (S53). For example, as shown in (A) of drawing 10 , there is migration from the 1st photography to the 2nd photography, and it asks for the part surrounded by the boundary line between two or more images as drawing 6 and drawing 7 explained. As the recognition result of the 1st photography and the recognition result of the 2nd photography show drawing 10 (B), respectively, supposing it is obtained, the information on a duplication part will be added to each recognition result. If a duplication alphabetic character is deleted from a new recognition result, there is no recognition alphabetic character which remained and return (S54) and the recognition alphabetic character which remained are in S49 (S54), the remaining recognition alphabetic characters will be compounded to the recognition result obtained in the last process. The information on a duplication part is used at the time of this composition, and it compounds so that it may be correctly connected as a text. For example, a synthetic result comes to be shown in drawing 10 (C) to drawing 10 (B).

[0039] If all the character recognition of a photographic subject manuscript is completed (S48 or S49), according to directions of a user, a recognition result will be recorded on a record medium 12, or will be outputted outside by the external interface.

[0040] In addition, when a lens system arrives at a tele edge before becoming large like the case of drawing 3 , by the time it had recognized the graphic size (S37), it warns of a recognition impossibility and approach for a photographic subject is demanded from a user (S57).

[0041] It will end, if there is actuation which ends the character recognition of a photographic subject

(S58).
[0042] Since character recognition of the captured alphabetic character image is carried out to at any time, data will be high-compressed substantially, and there is little data storage capacity in a system, and it can be managed with the actuation shown in drawing 8 and drawing 9 . When it puts in another way, there is an advantage that a lot of data can be treated.
[0043] Change as a result of [in S9-S18 in drawing 4 and drawing 9] the photography image in S41-S55, a storage image, or as a result of [character recognition] is explained with reference to drawing 11 - drawing 16 . The alphabetic character field (A) drawing 11 is a manuscript and according [drawing 12] to the 1st photography, its storage image, or a recognition result (B), The alphabetic character field (A) according [drawing 13] to the 2nd photography, its storage image, or a recognition result (B), The alphabetic character field (A) according [the alphabetic character field (A) according / drawing 14 / to the 3rd photography, its storage image or a recognition result (B), and drawing 15] to the 4th photography, its storage image or a recognition result (B), and drawing 16 show a collection storage image or a recognition result.
[0044] When the alphabetic character field part inputted by the 1st photography shows drawing 12 (A) to the manuscript shown in drawing 11 , the photography image or recognition result memorized is the same as drawing 12 (A), as shown in drawing 12 (B), noting that there is no character recognition error. a duplication part becomes worse for a while, and in the 2nd photography, it overlaps in part from the 1st photography, and right-hand side is photoed, and as shown in a finder or a monitor at drawing 13 (A), it is displayed (or it colors -- having). By this 2nd photography, a storage image or a recognition result becomes like drawing 13 (B). In drawing 13 (B), the image (or recognition result) part by pre-photography (1st photography) is surrounded by the dotted line so that intelligibly. The new image (or new character recognition result) obtained by the 2nd photography is compounded following the part enclosed with a dotted line.
[0045] Similarly, an image as shown in a finder or a monitor at drawing 14 (A) is displayed by the 3rd photography, and a synthetic image or a recognition result comes to be shown in drawing 14 (B) by it. An image as shown in a finder or a monitor at drawing 15 (A) is displayed by the 4th photography, and a synthetic image or a recognition result comes to be shown in drawing 15 (B) by it. Drawing 14 (B) and drawing 15 (B) also surround the synthetic image or recognition result of a just before by the dotted line, and are shown.
[0046] A final synthetic image or a recognition result becomes the same as the manuscript which comes to show to drawing 16 and is shown in drawing 11 .
[0047] Drawing 17 and drawing 18 show the 3rd operation flow chart of this example as a whole.
[0048] By actuation of photography initiation of a photography person, photography begins (S61) and a lens system is first moved to a wide edge (S62). A document field is extracted from a photographic subject image (S63), and columnar writing or lateral writing is distinguished (S64). The usual document opens line spacing, and is written and a line writing direction agrees to a large purport horizontal direction or a perpendicular direction to an image pick-up side. What is necessary is to be horizontal or perpendicular and just to let the direction with few degrees where a signal component changes be a line writing direction as the distinction approach of columnar-writing lateral writing, for example. Then, the photography field angle which becomes the magnitude in which character recognition is possible from the graphic size on a photography image, a field angle rate, and its order of photography are displayed on a finder or monitor display (S65). For example, to the manuscript shown in drawing 19 , as shown in drawing 20 , a photography field angle, a field angle rate, and its order of photography are displayed.
[0049] If it becomes the magnitude which can be recognized before controlling to a lens system call-side to become the field angle and photographic coverage which were set up by S65 (S66) and arriving at a tele edge (S67), as a dotted line shows a photography character row so that it may become in parallel horizontally [it is right and / an image pick-up side] or vertically, 1 or the two or more datum lines will be displayed on a finder or a monitor at drawing 21 . Whether the datum line is drawn perpendicularly or it lengthens horizontally follow the result of having carried out columnar writing and lateral-writing detection by S64. Moreover, although spacing of the datum line is set up according to line spacing when

drawing two or more datum lines, the datum-line spacing is also set up by the detection result of S64. Thereby, a document field can be photoed so that a character row may become horizontal or vertical within a photography image.

[0050] The address (2-dimensional coordinate) of the memory which memorizes the positional information of two or more images is reset (S71), the first photography image is memorized (S72), and the address (2-dimensional coordinate location) of the image is memorized (S73).

[0051] Photography will be continued, if it distinguishes whether directions which do not continue and photo the remaining document (or field) are made (S74) and there are no directions of a photography termination. That is, the image, the movement magnitude of photography drawing current from current photography drawing, and the migration direction which were memorized in the last process are detected (S75). If it distinguishes whether the specified quantity whose movement magnitude and migration direction which were detected are the threshold judged that a new image will be captured is reached (S76) and movement magnitude has not reached the specified quantity, the loop formation of S74, S75, and S76 is carried out, and it will be in a waiting state until movement magnitude reaches a predetermined value. (S76) and a new image will be captured for movement magnitude beyond the predetermined value at a certain time. The superposition part of the present photography image and a storage image is displayed from the detection result of movement magnitude and the migration direction (S77). Since there is a possibility that an image may be uncompoundable by suitable physical relationship when there are few parts which distinguish and (S78) lap [whether there is any amount (for example, the numbers of trains, and a line count or the numbers of alphabetic characters, such as a character string) of a superposition part beyond a predetermined value and], it moves, warns of **** (S79), and returns to S74. When there is a lap of the specified quantity (S78), the positional information over the image photoed [movement magnitude and] from migration just before is counted as the image address (S80), an image is memorized to the address (S81), and the image address is memorized (S82).

[0052] Photography actuation will be suspended if there are directions of a photography termination of the remaining document (S74). When the inside of a paddle with two or more images memorized by the last process is distinguished (S83) and two or more images exist, those images are compounded according to each image address (S84). In accordance with fixed criteria, as the duplication part of an image was explained previously, it is deleted. Character recognition is performed to a synthetic image or a single image (S85), and a recognition result is recorded on a record medium (S86).

[0053] When photoing a manuscript other than the manuscript photoed in the last process, it progresses to S62 and the above-mentioned process is repeated (S87), and when that is not right, it ends.

[0054] In the actuation shown in drawing 17 and drawing 18 , since the need of carrying out division photography of the manuscript, its field angle, the count of photography, and photography sequence are displayed, a user is effective in the ability to grasp visually and easily photographic coverage, the order of photography, etc. of a manuscript which are a photographic subject. Moreover, a user can photo a photographic subject manuscript so that a text line may become horizontal or vertical, and it becomes easy to attain the high rate of character recognition by performing columnar writing and lateral-writing distinction of a document, and displaying the datum line according to the distinction result. Since an image is not captured when the movement magnitude of two or more images question is below the specified quantity, there is little image or recognition result data storage capacity, and it ends. By maintaining the amount of duplications between images more than the specified quantity, the information for composition increases and image composition can be carried out more at accuracy. By making an alphabetic character into a unit for the movement magnitude and the amount of duplications between images, it becomes the synthetic processing corresponding to human being's decision criterion, and a feeling of use improves.

[0055]

[Effect of the Invention] According to invention concerning this application, the operability of character recognition can be improved and recognition precision can be raised so that he can understand easily from the above explanation. Furthermore, it is in the distance of arbitration from a photographic subject manuscript, and the character recognition of the photographic subject manuscript of the magnitude of

h g cg b eb cg e e

arbitration becomes possible. Moreover, when a user incorporates a photographic subject manuscript, capture an image depending on a natural way of moving like whether an alphabetic character is followed by viewing, it becomes unnecessary to be anxious to the method of scanning for an image input, and user-friendliness becomes good.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Industrial Application] This invention relates to an image processing system.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] In character recognition, conventionally, a printer graphic is first image-data-ized with image input means, such as an image scanner, and an alphabetic character image is changed into a character code with the character recognition software on a computer after that. As an image input means, there is a digital electronic camera other than an image scanner. The digital electronic camera is suitable, when a printing side is not superficial, or when carrying out the image input of the big thing which cannot be read by the image scanner.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] According to invention concerning this application, the operability of character recognition can be improved and recognition precision can be raised so that he can understand easily from the above explanation. Furthermore, it is in the distance of arbitration from a photographic subject manuscript, and the character recognition of the photographic subject manuscript of the magnitude of arbitration becomes possible. Moreover, when a user incorporates a photographic subject manuscript, capture an image depending on a natural way of moving like whether an alphabetic character is followed by viewing, it becomes unnecessary to be anxious to the method of scanning for an image input, and user-friendliness becomes good.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] When using a digital electronic camera as an image input means for character recognition, a graphic size [in / with a natural thing / a photography image] must be large to extent in which character recognition is possible. In order to photo an alphabetic character in the magnitude in which character recognition is possible, when dividing a photographic subject manuscript into multiple times and photoing it, after capturing two or more images and carrying out character recognition of each image, text editing of each character recognition result will be carried out to original sequence with a word processor, and there is a fault of taking complicated actuation and great time amount.
[0004] This invention aims at showing the image processing system which cancels such un-arranging.
[0005] This invention aims at offering the image processing system which raised operability again.
[0006] This invention aims at offering further the image processing system which raised the precision of character recognition.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] A conversion means by which the image processing system concerning the 1st invention changes a photographic subject image into an electrical signal continuously, A motion detection means to detect a motion of the image in the conversion side of the conversion means concerned, It is characterized by having a synthetic means to compound two or more images twisted for the conversion means concerned, and a character recognition means to change into a character code the alphabetic character image in the synthetic image compounded by the synthetic means concerned, according to the motion detected by the motion detection means concerned.
[0008] The 2nd this invention is characterized by providing the following in the image processing system concerning invention. A conversion means to change a photographic subject image into an electrical signal continuously A motion detection means to detect a motion of the image in the conversion side of the conversion means concerned An alphabetic character signal transduction means to change into text the alphabetic character image contained in each image changed by the conversion means concerned An alphabetic character merge means to compound the alphabetic character recognized by the alphabetic character signal transduction means concerned according to the motion detected by the motion detection means concerned
[0009] The image processing system concerning the 3rd invention has a variable power function, and is characterized by having a conversion means to change an optical image into an electrical signal continuously, an alphabetic character field detection means to detect the alphabetic character field in the optical image concerned, and the control means that operates the variable power function concerned based on the detection result of the alphabetic character field detection means concerned.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

OPERATION

[Function] The correspondence to the manuscript of the magnitude of arbitration is attained by adding a character recognition function to image pick-up equipment. Moreover, since the graphic size of a photographic subject manuscript is detected at the time of photography, it distinguishes whether character recognition is possible and it carries out photomacrography to the magnitude which can be recognized suitably, a recognition rate can be raised. Furthermore, since the physical relationship between two or more images accompanying a motion of a photography image is detected at any time and two or more images or the recognition result of those is image-compounded or text compounded based on a detection result, it is not necessary to carry out complicated actuation.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EXAMPLE

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.
[0012] Drawing 1 shows the outline configuration block Fig. of one example of this invention. In drawing 1 , 10 is an expansion card in which the body of a digital electronic camera and 12 possess the record media (memory card or a hard disk drive unit of PCMCIA specification etc.), and 14 possesses a character recognition function. An expansion card 14 can connect or communicate also with a host computer 16.
[0013] In the body 10 of a camera, CPU by which the diaphragm combination shutter which a taking lens and 22 extract 20 and serves both as a function and a shutter function, and 24 control a stroboscope, and 26 controls the device section and a control unit, and 28 are drive circuits which drive the device section. The image sensor from which 30 changes the optical image of the photographic subject by the taking lens 20 into an electrical signal, The timing signal generating circuit which generates a timing signal required in order that 32 may operate an image sensor 30, The image sensor drive circuit where 34 drives an image sensor 30 according to the timing signal from the timing signal generating circuit 32, The front-end processing circuit equipped with the nonlinear amplifying circuit which carries out nonlinear magnification before the CDS circuit where 36 removes a noise from the output of an image sensor 30, and A/D conversion, and 38 are A/D converters which change the analog output of the front-end processing circuit 36 into a digital signal. CPU for signal-processing system control by which 40 controls buffer memory and 42 controls each signal-processing section, the actuation display with which 44 displays the information for actuation assistance and the condition of a camera, and 46 are the operating sets for controlling the body 10 of a camera from the outside. 48 is a memory bus control circuit which controls a transfer of image data and voice data, and possesses the function to also detect a motion vector at the time of a seriography, in this example while it controls writing and read-out of buffer memory 40.
[0014] The interface whose 50 connects a record medium 12 to a body 10, and 52 are extended interfaces which connect an expansion card 14.
[0015] The A/D converter which 54 digitizes voice input circuits, such as a microphone, and 56 digitizes the analog output of the voice input circuit 54, and is impressed to CPU42 for signal-processing control, the D/A converter with which 58 analog-izes the digital sound signal from CPU42 for signal-processing control, and 60 are switches which choose the sound signal from the output of the voice input circuit 54, the output of D/A converter 58, or the extended interface 52, and are impressed to an audio output device 62. Although an audio output device 62 is generally a loudspeaker, you may be a voice output terminal. The D/A converter which changes into an analog video signal the image data 64 is remembered to be by buffer memory 38, and 66 are switches which choose the video-signal output of the front-end processing circuit 36, the video-signal output of D/A converter 64, or the video signal from an expansion card 52, and are impressed to the image output unit 68. Although the image output unit 68 is generally a graphic display device, you may be an image output terminal.
[0016] Drawing 2 shows the outline configuration block Fig. inside an expansion card 14. For an image pick-up digital disposal circuit and 74, as for buffer memory and 78, an infanticide processing circuit

and 76 are [70 / an expansion bus interface (I/F) and 72 / a bus controller and 80] external I/F controllers. The D/A converter from which an animation compression expansion circuit and 84 change the image data from buffer memory 76 into a video encoder, and 82 changes 86 into an analog signal, the A/D converter with which 88 digitizes the analog sound signal from the body 10 of a camera, and 90 are D/A converters which change into an analog signal the voice data which should be outputted to the body 10 of a camera. The program RAM the RISC mold CPU in which a high-speed operation of 92 is possible, and 94 remember the program of the RISC mold CPU 92 of operation to be, and 96 are flash ROMs which memorize BIOS of the RISC mold CPU 92.

[0017] First, the original actuation as a digital electronic camera is explained briefly. When a photography person does actuation predetermined with an operating set 46, it will be in the condition which can be photoed and the device section and CPU26 for control unit control will control a lens system in the condition according to an intention of a photography person through the drive circuit 28. Under the present circumstances, photography conditions etc. are displayed on the actuation display 44, and the situation of a camera is told to a photography person. A non-illustrated photometry circuit measures the brightness of a photographic subject, the device section and CPU26 for control unit control compute the drawing value and shutter speed of the diaphragm combination shutter 22 according to this measured value, the drive circuit 28 extracts according to that calculation value, and the combination shutter 22 is driven. Moreover, a stroboscope 24 is made to emit light as a photography fill-in flash depending on a photometry result.

[0018] An image sensor 30 changes a taking lens 20 and the optical image of the photographic subject by the diaphragm combination shutter 22 into an electrical signal. When interlace read-out mold CCD series is used as an image sensor 30, it can prevent that light carries out incidence and has a bad influence during a transfer at a signal charge by forming the diaphragm combination shutter 22. The drive circuit 34 amplifies the output of the timing signal generating circuit 32, and drives an image sensor 30. In addition, the timing signal generating circuit 32 is controlled by CPU42 for signal-processing control.

[0019] Thus, the output of the driven image sensor 30 is inputted into the front-end processing circuit 36. While CDS processing removes the low-pass noise contained in the output of an image sensor 30, nonlinear processing of the front-end processing circuit 36 is carried out so that the dynamic range of A/D converter 38 can be used effectively. The output of the front-end processing circuit 36 is changed into a digital signal by A/D converter 38, and is impressed to the memory bus control circuit 48.

[0020] Under control of CPU42 for signal processing, the memory bus control circuit 48 is read in order of predetermined [which is decided by the color filter configuration of an image sensor 30 etc.], once accumulating the output of A/D converter 38 in buffer memory 40. The read photography image data is impressed and recorded on a record medium 12 through an interface 50.

[0021] Next, characteristic actuation of this example is explained. In this example, character recognition functional software and image composition functional software are written in the program RAM 94 of an expansion card 14 through the external-interface controller 80 from a host computer 16. Although the RISC mold CPU is used as a processor in which a high-speed operation is possible, of course, other processors, such as the CISC mold CPU, may be used.

[0022] Drawing 3 and drawing 4 show the operation flow chart of the device section and CPU26 for control unit control controlled by the objects CPU42 and CPU42 for signal-processing control in this example as a whole. Actuation of this example is explained with reference to drawing 3 and drawing 4 .

[0023] While photography begins (S1) and moving a lens system to a wide edge first by actuation of photography initiation of a photography person (S2), the document field of a photographic subject image is extracted (S3). As a result of the extract of a document field, zooming is carried out until it controls (S4) and a lens system and either of vertical fills an image pick-up side horizontally [an alphabetic character field], when it distinguishes whether a document field exists over the whole surface of an image pick-up side and (S4) and an alphabetic character field remain in a part of image pick-up side (S10-S13, S6-S8). It specifically expands so that an alphabetic character field may fill with a longitudinal direction first (S10), and it judges whether it is the magnitude which can be recognized

(S11). A photography image will be memorized if recognition is possible (S14). As shown in drawing 5 , to the manuscript, the photography image memorized here is relation like the image pick-up side A, and contains the whole photographic subject document.
[0024] When it cannot recognize by S11, a lens system is controlled, and zooming is carried out so that a character string may fill an image pick-up side with the direction of a short hand (S12). It distinguishes whether the graphic size of the photography image of the result can be recognized (S13). An image will be memorized if recognition is possible as a result of distinction (S13) (S9). The image memorized here has relation like the image pick-up side B to the manuscript, as shown in drawing 5 .
[0025] Moreover, when the extracted document field is crossing all over the image pick-up side, it judges whether character recognition is possible from (S4) and a graphic size (S5), and a photography image will be memorized if recognition is possible (S39). The image memorized here is a thing like the image pick-up side C containing some manuscripts, as shown in drawing 5 .
[0026] Since the image memorized by S9 contains some photographic subject manuscripts, it investigates whether actuation of forbidding photography of the remaining document is made (S15). If actuation of the ban on photography is not made, (S9) and photography are continued, the direction which the camera moved by the motion vector of a photography image, and movement magnitude are detected (S16), and the physical relationship of the image currently photoed at present to the image memorized in the last process is searched for. It displays so that a finder or a monitor may understand a duplication part for the part already memorized in the before process among the present photography images with a photography image from the physical relationship searched for (S17).
[0027] As the detection approach of a duplication part, it is performed as follows, for example. That is, as shown in drawing 6 , the positional information to the boundary line which determines two or more attention pixels of the division fields (a, b, c, d) and the field angle of an image pick-up side for motion detection after carrying out field division of the inside of a photography image is memorized beforehand. As shown in drawing 7 , the movement magnitude and the migration direction (for example, from a to a' and from b to b') of an attention pixel of [between two or more images (the 1st photography image and 2nd photography image)] are computed, the physical relationship of the field angle boundary line between two or more images is searched for, and the part (drawing 7 shadow area) surrounded by the field angle boundary line between images is made into a duplication part.
[0028] Then, S16-S8 are repeated until it carries out image composition of the image memorized in the last process, and the newly photoed image so that physical relationship and a duplication part may be connected, and it memorizes or records the synthetic image (S18) and the remainder of a document is lost (S15).
[0029] If an alphabetic character image required for character recognition is captured (S13 or S15), character recognition of the image memorized by S14 or S18 will be performed (S19). According to directions of a user, a character recognition result is recorded on a record medium 12, or is outputted outside by the external interface.
[0030] In addition, when a lens system arrives at a tele edge before becoming large, by the time it had recognized the graphic size (S6), it warns of a recognition impossibility and approach for a photographic subject is demanded from a user (S21).
[0031] It will end, if there is actuation which ends the character recognition of a photographic subject (S22).
[0032] In this example, since image composition of the photography image is carried out at any time, the amount of positional information between the images for composition decreases comparatively, and it is effective in the location management between images becoming easy.
[0033] Drawing 8 and drawing 9 show the 2nd operation flow chart of this example.
[0034] While photography begins (S31) and moving a lens system to a wide edge first by actuation of photography initiation of a photography person (S32), the document field of a photographic subject image is extracted (S33). When it distinguishes whether a document field exists over the whole surface of an image pick-up side as a result of the extract of a document field (S34) and an alphabetic character field remains in a part of image pick-up side (S34), zooming is carried out until it controls a lens system

and either of vertical fills an image pick-up side horizontally [an alphabetic character field] (S42-S47, S37-S40). It specifically expands so that an alphabetic character field may fill with a longitudinal direction first (S42), and character recognition is performed in the condition (S43), and it distinguishes whether character recognition is possible (S44), and a recognition result will be memorized if recognition is possible (S48). In drawing 5 , to the manuscript, the recognition result memorized here is relation like the image pick-up side A, and has brought a recognition result of the whole photographic subject document.

[0035] When it cannot recognize by S44, a lens system is controlled, and zooming is carried out so that a character string may fill an image pick-up side with the direction of a short hand (S45). Character recognition is performed in the condition (S46), and it distinguishes whether character recognition is possible (S47). A recognition result will be memorized if recognition is possible (S41). The recognition result memorized here is what carried out character recognition of the image pick-up side B over a manuscript, as shown in drawing 5 .

[0036] Moreover, when the extracted document field is crossing all over the image pick-up side (S34), it remains as it is, character recognition is performed (S35), and it judges whether character recognition is possible (S36). A recognition result will be memorized if recognition is possible (S41). The recognition result memorized here has brought some recognition results of a manuscript, as shown in drawing 5 as an image pick-up side C.

[0037] Since the recognition result memorized by S41 consists of some photographic subject manuscripts, it investigates whether actuation of forbidding photography of the remaining part is made (S49). If actuation of the ban on photography is not made (S49), photography is continued, the direction which the camera moved by the motion vector of a photography image, and movement magnitude are detected (S50), and the physical relationship of the image currently photoed at present to the image which carried out character recognition to just before is searched for. A photography image is displayed on a finder or a monitor so that the physical relationship searched for may show clearly a duplication part with the part by which character recognition has already been carried out in the before process among the present photography images (S51).

[0038] Character recognition of the image currently photoed at present is performed (S52), and if there is a part which overlaps between the recognition result memorized in the last process and the newly obtained recognition result, a duplication part will be deleted from the newly obtained recognition result (S53). For example, as shown in (A) of drawing 10 , there is migration from the 1st photography to the 2nd photography, and it asks for the part surrounded by the boundary line between two or more images as drawing 6 and drawing 7 explained. As the recognition result of the 1st photography and the recognition result of the 2nd photography show drawing 10 (B), respectively, supposing it is obtained, the information on a duplication part will be added to each recognition result. If a duplication alphabetic character is deleted from a new recognition result, there is no recognition alphabetic character which remained and return (S54) and the recognition alphabetic character which remained are in S49 (S54), the remaining recognition alphabetic characters will be compounded to the recognition result obtained in the last process. The information on a duplication part is used at the time of this composition, and it compounds so that it may be correctly connected as a text. For example, a synthetic result comes to be shown in drawing 10 (C) to drawing 10 (B).

[0039] If all the character recognition of a photographic subject manuscript is completed (S48 or S49), according to directions of a user, a recognition result will be recorded on a record medium 12, or will be outputted outside by the external interface.

[0040] In addition, when a lens system arrives at a tele edge before becoming large like the case of drawing 3 , by the time it had recognized the graphic size (S37), it warns of a recognition impossibility and approach for a photographic subject is demanded from a user (S57).

[0041] It will end, if there is actuation which ends the character recognition of a photographic subject (S58).

[0042] Since character recognition of the captured alphabetic character image is carried out to at any time, data will be high-compressed substantially, and there is little data storage capacity in a system, and

it can be managed with the actuation shown in drawing 8 and drawing 9 . When it puts in another way, there is an advantage that a lot of data can be treated.
[0043] Change as a result of [in S9-S18 in drawing 4 and drawing 9] the photography image in S41-S55, a storage image, or as a result of [character recognition] is explained with reference to drawing 11 - drawing 16 . The alphabetic character field (A) drawing 11 is a manuscript and according [drawing 12] to the 1st photography, its storage image, or a recognition result (B), The alphabetic character field (A) according [drawing 13] to the 2nd photography, its storage image, or a recognition result (B), The alphabetic character field (A) according [the alphabetic character field (A) according / drawing 14 / to the 3rd photography, its storage image or a recognition result (B), and drawing 15] to the 4th photography, its storage image or a recognition result (B), and drawing 16 show a collection storage image or a recognition result.
[0044] When the alphabetic character field part inputted by the 1st photography shows drawing 12 (A) to the manuscript shown in drawing 11 , the photography image or recognition result memorized is the same as drawing 12 (A), as shown in drawing 12 (B), noting that there is no character recognition error. a duplication part becomes worse for a while, and in the 2nd photography, it overlaps in part from the 1st photography, and right-hand side is photoed, and as shown in a finder or a monitor at drawing 13 (A), it is displayed (or it colors -- having). By this 2nd photography, a storage image or a recognition result becomes like drawing 13 (B). In drawing 13 (B), the image (or recognition result) part by pre-photography (1st photography) is surrounded by the dotted line so that intelligibly. The new image (or new character recognition result) obtained by the 2nd photography is compounded following the part enclosed with a dotted line.
[0045] Similarly, an image as shown in a finder or a monitor at drawing 14 (A) is displayed by the 3rd photography, and a synthetic image or a recognition result comes to be shown in drawing 14 (B) by it. An image as shown in a finder or a monitor at drawing 15 (A) is displayed by the 4th photography, and a synthetic image or a recognition result comes to be shown in drawing 15 (B) by it. Drawing 14 (B) and drawing 15 (B) also surround the synthetic image or recognition result of a just before by the dotted line, and are shown.
[0046] A final synthetic image or a recognition result becomes the same as the manuscript which comes to show to drawing 16 and is shown in drawing 11 .
[0047] Drawing 17 and drawing 18 show the 3rd operation flow chart of this example as a whole.
[0048] By actuation of photography initiation of a photography person, photography begins (S61) and a lens system is first moved to a wide edge (S62). A document field is extracted from a photographic subject image (S63), and columnar writing or lateral writing is distinguished (S64). The usual document opens line spacing, and is written and a line writing direction agrees to a large purport horizontal direction or a perpendicular direction to an image pick-up side. What is necessary is to be horizontal or perpendicular and just to let the direction with few degrees where a signal component changes be a line writing direction as the distinction approach of columnar-writing lateral writing, for example. Then, the photography field angle which becomes the magnitude in which character recognition is possible from the graphic size on a photography image, a field angle rate, and its order of photography are displayed on a finder or monitor display (S65). For example, to the manuscript shown in drawing 19 , as shown in drawing 20 , a photography field angle, a field angle rate, and its order of photography are displayed.
[0049] If it becomes the magnitude which can be recognized before controlling to a lens system call-side to become the field angle and photographic coverage which were set up by S65 (S66) and arriving at a tele edge (S67), as a dotted line shows a photography character row so that it may become in parallel horizontally [it is right and / an image pick-up side] or vertically, 1 or the two or more datum lines will be displayed on a finder or a monitor at drawing 21 . Whether the datum line is drawn perpendicularly or it lengthens horizontally follow the result of having carried out columnar writing and lateral-writing detection by S64. Moreover, although spacing of the datum line is set up according to line spacing when drawing two or more datum lines, the datum-line spacing is also set up by the detection result of S64. Thereby, a document field can be photoed so that a character row may become horizontal or vertical within a photography image.

[0050] The address (2-dimensional coordinate) of the memory which memorizes the positional information of two or more images is reset (S71), the first photography image is memorized (S72), and the address (2-dimensional coordinate location) of the image is memorized (S73).
[0051] Photography will be continued, if it distinguishes whether directions which do not continue and photo the remaining document (or field) are made (S74) and there are no directions of a photography termination. That is, the image, the movement magnitude of photography drawing current from current photography drawing, and the migration direction which were memorized in the last process are detected (S75). If it distinguishes whether the specified quantity whose movement magnitude and migration direction which were detected are the threshold judged that a new image will be captured is reached (S76) and movement magnitude has not reached the specified quantity, the loop formation of S74, S75, and S76 is carried out, and it will be in a waiting state until movement magnitude reaches a predetermined value. (S76) and a new image will be captured for movement magnitude beyond the predetermined value at a certain time. The superposition part of the present photography image and a storage image is displayed from the detection result of movement magnitude and the migration direction (S77). Since there is a possibility that an image may be uncompoundable by suitable physical relationship when there are few parts which distinguish and (S78) lap [whether there is any amount (for example, the numbers of trains, and a line count or the numbers of alphabetic characters, such as a character string) of a superposition part beyond a predetermined value and], it moves, warns of **** (S79), and returns to S74. When there is a lap of the specified quantity (S78), the positional information over the image photoed [movement magnitude and] from migration just before is counted as the image address (S80), an image is memorized to the address (S81), and the image address is memorized (S82).
[0052] Photography actuation will be suspended if there are directions of a photography termination of the remaining document (S74). When the inside of a paddle with two or more images memorized by the last process is distinguished (S83) and two or more images exist, those images are compounded according to each image address (S84). In accordance with fixed criteria, as the duplication part of an image was explained previously, it is deleted. Character recognition is performed to a synthetic image or a single image (S85), and a recognition result is recorded on a record medium (S86).
[0053] When photoing a manuscript other than the manuscript photoed in the last process, it progresses to S62 and the above-mentioned process is repeated (S87), and when that is not right, it ends.
[0054] In the actuation shown in drawing 17 and drawing 18 , since the need of carrying out division photography of the manuscript, its field angle, the count of photography, and photography sequence are displayed, a user is effective in the ability to grasp visually and easily photographic coverage, the order of photography, etc. of a manuscript which are a photographic subject. Moreover, a user can photo a photographic subject manuscript so that a text line may become horizontal or vertical, and it becomes easy to attain the high rate of character recognition by performing columnar writing and lateral-writing distinction of a document, and displaying the datum line according to the distinction result. Since an image is not captured when the movement magnitude of two or more images question is below the specified quantity, there is little image or recognition result data storage capacity, and it ends. By maintaining the amount of duplications between images more than the specified quantity, the information for composition increases and image composition can be carried out more at accuracy. By making an alphabetic character into a unit for the movement magnitude and the amount of duplications between images, it becomes the synthetic processing corresponding to human being's decision criterion, and a feeling of use improves.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline configuration block Fig. of one example of this invention.
[Drawing 2] It is an outline configuration block Fig. inside the expansion card 14 of drawing 1 .
[Drawing 3] It is a part of 1st operation flow chart of this example.
[Drawing 4] It is a part of 1st operation flow chart of this example.
[Drawing 5] It is the explanatory view of the relation between a manuscript and photographic coverage (or image of an image pick-up side).
[Drawing 6] It is the explanatory view of the attention pixel in a field angle.
[Drawing 7] It is the explanatory view of the movement magnitude in two photography, and the migration direction.
[Drawing 8] It is a part of 2nd operation flow chart of this example.
[Drawing 9] It is a part of 2nd operation flow chart of this example.
[Drawing 10] It is the explanatory view of the synthetic process of the character recognition result in the actuation shown in drawing 8 and drawing 9 .
[Drawing 11] It is an example of a photographic subject manuscript.
[Drawing 12] It is as a result of [by the 1st photography to the manuscript shown in drawing 11] a photography image, a synthetic image, or as a result of [recognition].
[Drawing 13] It is as a result of [by the 2nd photography to the manuscript shown in drawing 11] a photography image, a synthetic image, or as a result of [synthetic recognition].
[Drawing 14] It is as a result of [by the 3rd photography to the manuscript shown in drawing 11] a photography image, a synthetic image, or as a result of [synthetic recognition].
[Drawing 15] It is as a result of [by the 4th photography to the manuscript shown in drawing 11] a photography image, a synthetic image, or as a result of [synthetic recognition].
[Drawing 16] It is as a result of [to the manuscript shown in drawing 11] a final synthetic image or as a result of [synthetic recognition].
[Drawing 17] It is a part of 3rd operation flow chart of this example.
[Drawing 18] It is a part of 3rd operation flow chart of this example.
[Drawing 19] It is an example of a photographic subject manuscript.
[Drawing 20] It is the example of a field angle standard display of S65.
[Drawing 21] It is the example of a datum-line display of S70.
[Description of Notations]
10: body of a digital electronic camera 12: -- record medium 14: -- expansion card 16: -- host computer 20: -- taking lens 22:diaphragm combination shutter 24: Stroboscope 26 : [The device section and the control unit control CPU] 28:device section drive circuit 30: -- image sensor 32:timing signal generating circuit 34:image sensor drive circuit 36:front-end processing circuit 38: -- A/D converter 40: Buffer memory 42 : [CPU for signal-processing system control] 44:actuation display 46: -- operating set 48:memory bus control circuit 50: -- interface 52:escape interface 54:voice input circuit 56: -- A/D converter 58: -- D/A converter 60: -- switch 62: -- audio output device 64:D/A-converter 66: -- switch

68:image output unit 70:expansion bus interface 72:image pick-up digital disposal circuit 74:infanticide processing circuit 76: -- buffer memory 78: -- bus controller 80:external I/F controller 82:animation compression expansion circuit 84:video encoder 86:D/A-converter 88: -- A/D converter 90: -- D/A converter 92:RISC mold CPU 94:program RAM 96: -- flash ROM

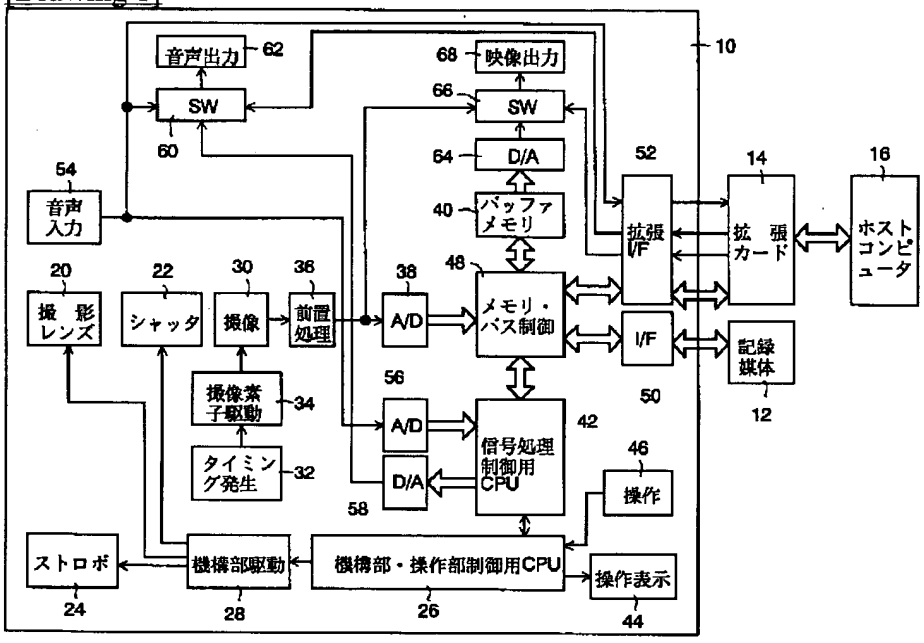
[Translation done.]

* NOTICES *

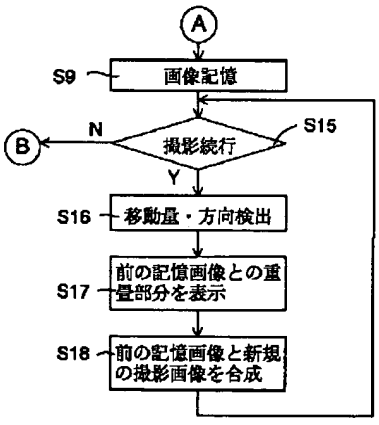
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

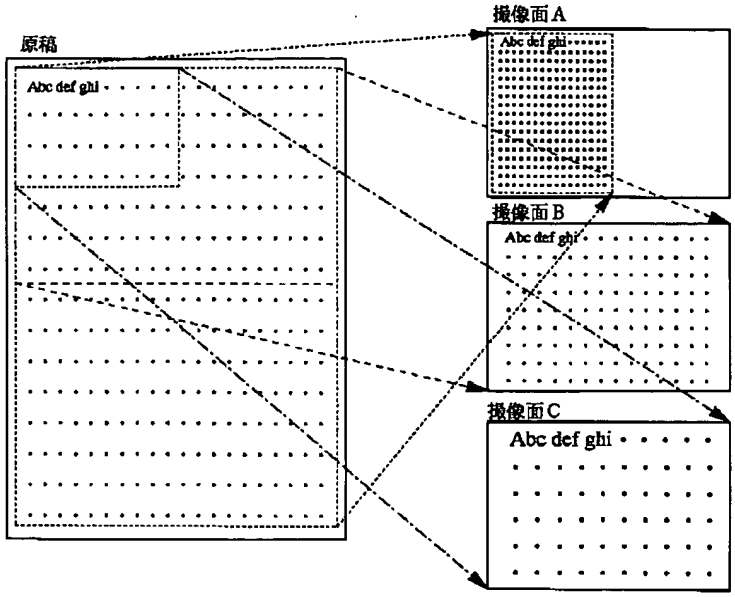
[Drawing 1]



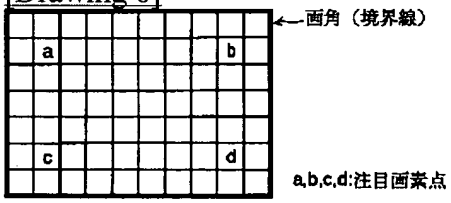
[Drawing 4]



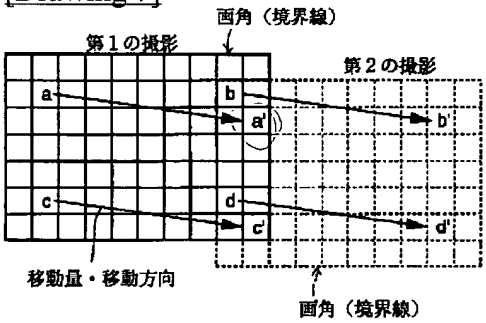
[Drawing 5]



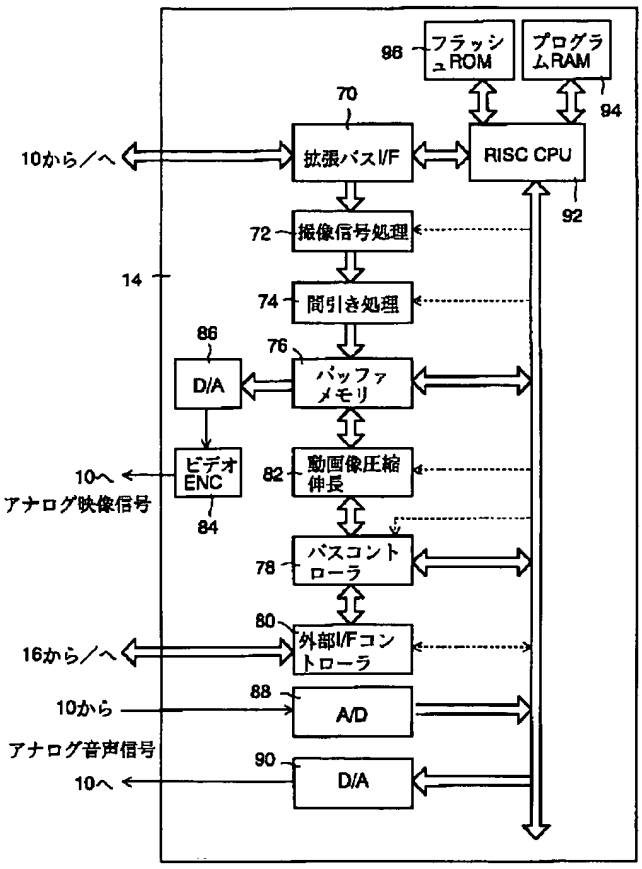
[Drawing 6]



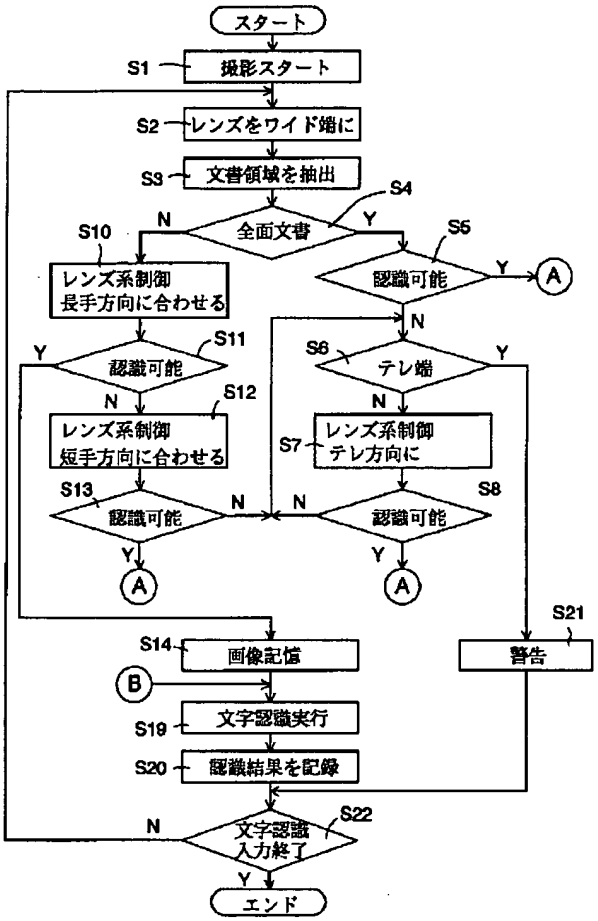
[Drawing 7]



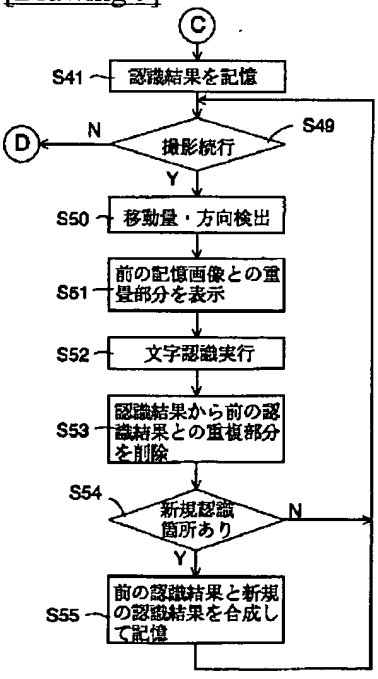
[Drawing 2]


98
フラッシュROM
プログラムRAM
94
70
10から／へ
拡張バスI/F
RISC CPU
92
72
撮像信号処理
14
74
間引き処理
86
76
D/A
バッファメモリ
10へ
アナログ映像信号
ビデオENC
82
動画像圧縮伸長
84
78
バスコントローラ
80
16から／へ
外部I/Fコントローラ
88
10から
A/D
アナログ音声信号
90
10へ
D/A

[Drawing 3]



[Drawing 9]



[Drawing 11]

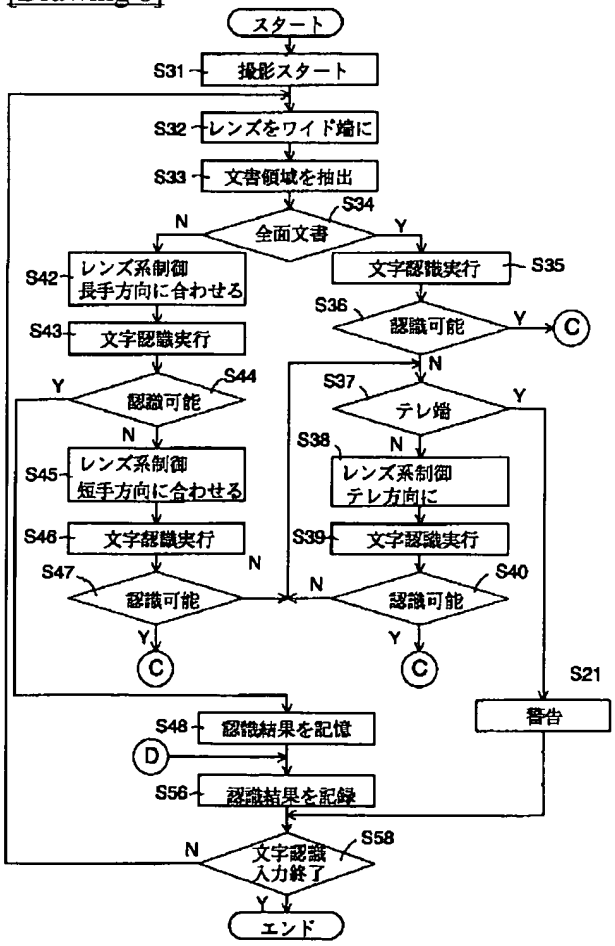
原稿

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑおあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑお

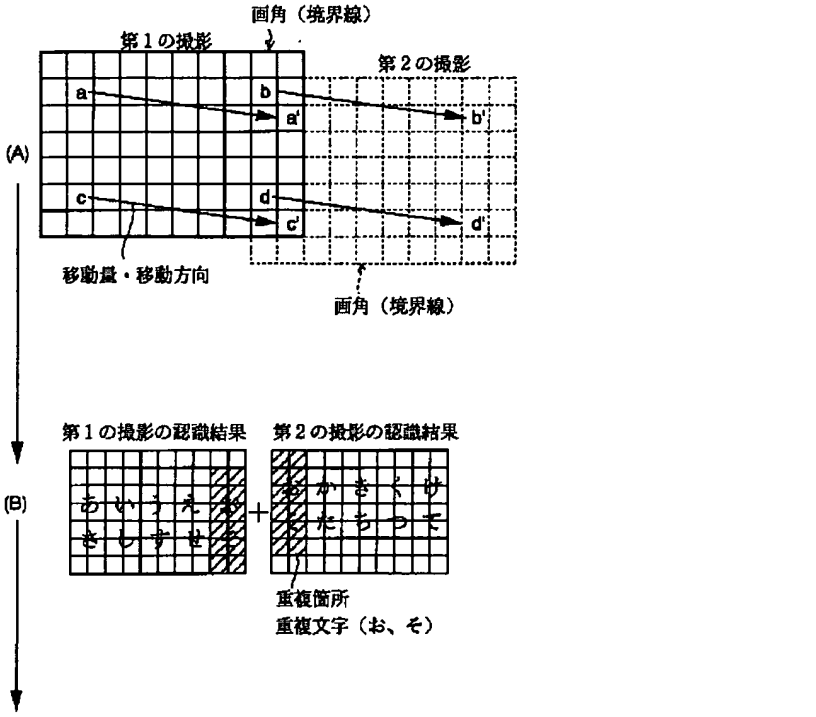
. . . . . .

. . . . . .

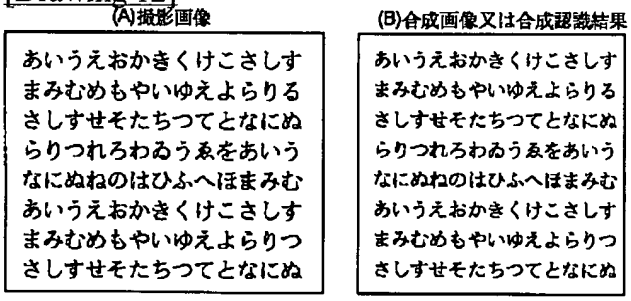
[Drawing 8]



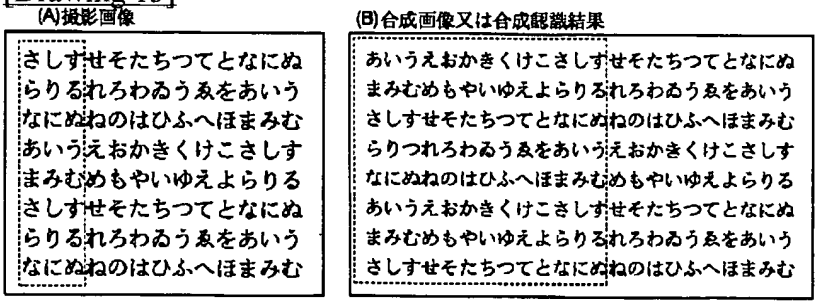
[Drawing 10]



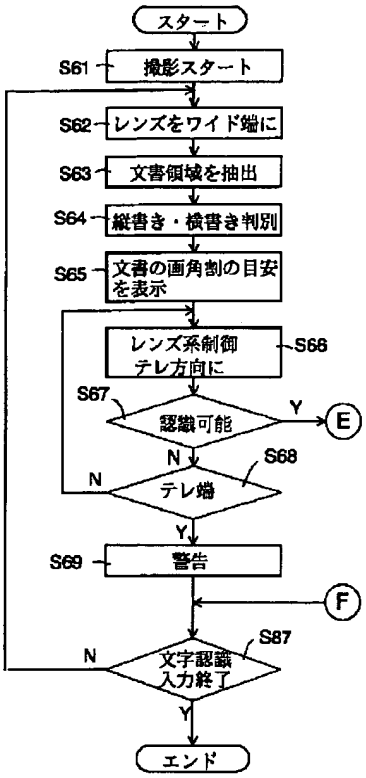
[Drawing 12]



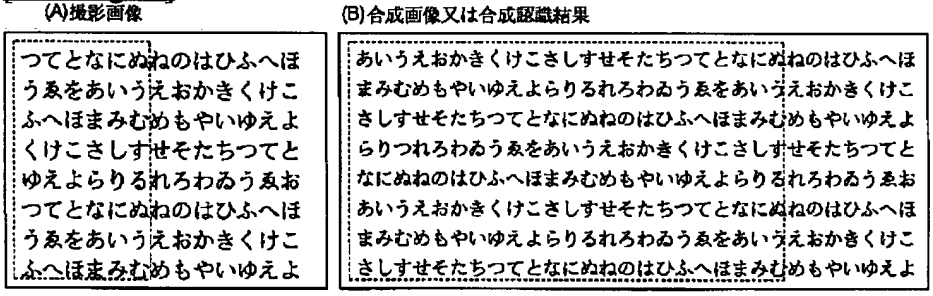
[Drawing 13]



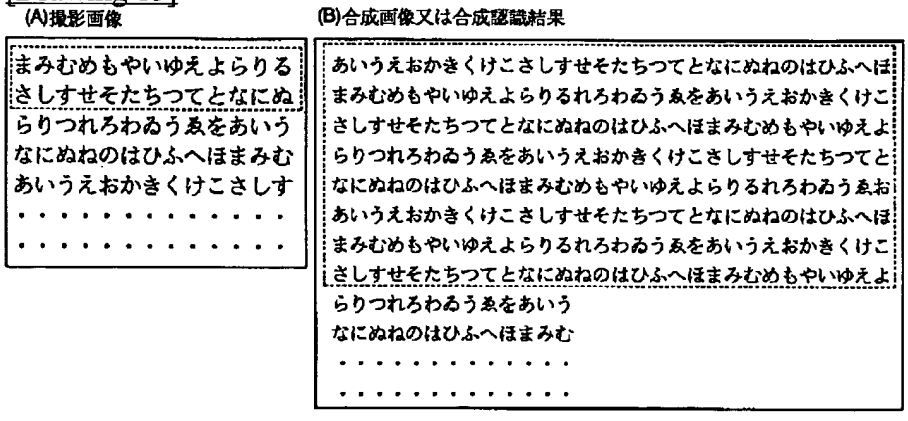
[Drawing 17]



[Drawing 14]



[Drawing 15]

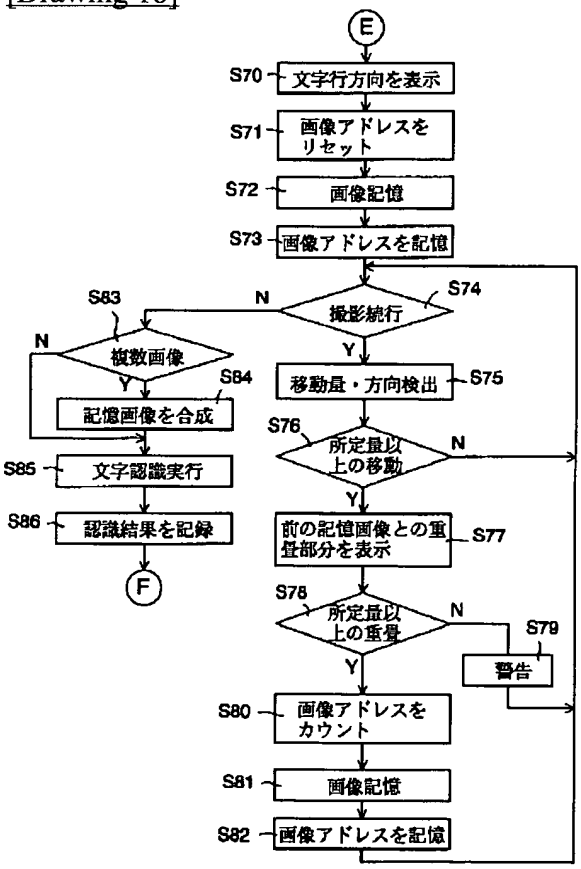


[Drawing 16]

認識結果

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑおあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑお

[Drawing 18]



[Drawing 19]

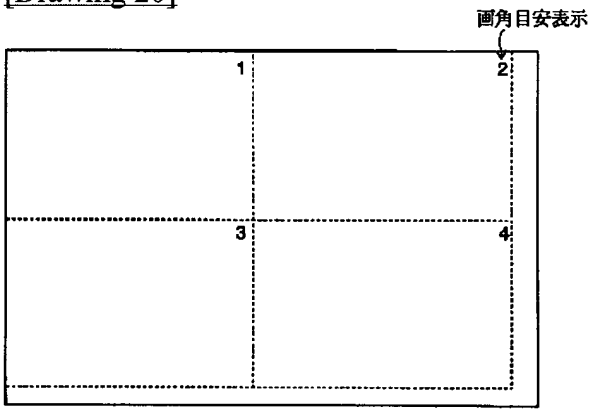
原稿

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑおあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよらりるれろわゐうゑお

. . . . . .

. . . . . .

[Drawing 20]



[Drawing 21]

あいうえおかきくけこさしす
まみむめもやいゆえよらりる
さしすせそたちつてとなにぬ
らりつれろわゐうゑをあいう
なにぬねのはひふへほまみむ
あいうえおかきくけこさしす
まみむめもやいゆえよらりる
さしすせそたちつてとなにぬ

[Translation done.]